AR-B6002 Board

Fan-less with Intel ATOM Pineview + ICH8M

User Manual

Copyright 2013

All Rights Reserved.

Manual's first edition:

For the purpose of improving reliability, design and function, the information in this document is subject to change without prior notice and does not represent a commitment on the part of the manufacturer.

The manufacturer (Acrosser) shall not be liable for direct, indirect, special, incidental, or consequential damages arising out of the use or inability to use the product or documentation, even if advised of the possibility of such damages.

This document contains proprietary information protected by copyright. All rights are reserved. No part of this Manual may be reproduced by any mechanical, electronic, or other means in any form without prior written permission of the manufacturer.

Trademarks

AR-B6002 is a registered trademarks of Acrosser; other product names mentioned herein are used for identification purposes only and may be trademarks and/or registered trademarks of their respective companies.

Table of Contents

1 INTRODUCTION 5

1.1 Specifications 5
1.2 Package Contents 6
1.3 Block Diagram 6

2 H/W INFORMATION 7

2.1 Locations of Connector and Jumper Setting 8
2.2 Connector and Jumper Setting Table 10
2.3 Power Subsystem 15
2.4 Remote Switch 18
2.5 Status LED 18
2.6 Fuse selection 19
2.7 COM1 / 2 to choose RS-232/RS-485/RS-422 by jumper setting 19
2.8 GPIO 19

3 BIOS SETTING 20

3.1 Main Setup 21
3.2 Advanced Setup 23
3.3 Power Setup 25
3.4 PnP/PCI Setup 26
3.5 Peripherals Setup 28
3.6 PC Health Setup 29
3.7 Boot Setup 30
3.8 Exit Setup 31

4 SOFTWARE INSTALLATION & PROGRAMMING GUIDE 33

4.1 Introduction 33
4.2 File Descriptions 41
4.3 API List and Descriptions 44
4.4 Appendix Programming Guide 67

5 OPTIONAL MODULE INTRODUCTIONS 68

5.1 GPS Module 68

5.2 Bluetooth Module 68
5.3 WiFi Module 68
5.4 3.5G Module.....69
5.5 GPIO and CAN bus cable color 69

FAQ 70

Appendix: Technical Support Form.....71

1 INTRODUCTION

AR-B6002 series with Intel Atom D425/D525 processor is a multi-functional In-Vehicle computer suitable for using in various applications. Besides basic I/O ports like VGA, USB, COM, LAN, and GPIO, and has embedded CAN BUS function to allow microcontrollers and devices to communicate with each other in vehicle.

In addition, AR-B6002 has intelligent power management function with software utility to monitor power status and to control power sequence, and is also compliant with most industry standards for in-vehicle usage including CE, FCC, and E-Mark 13.

1.1 Specifications

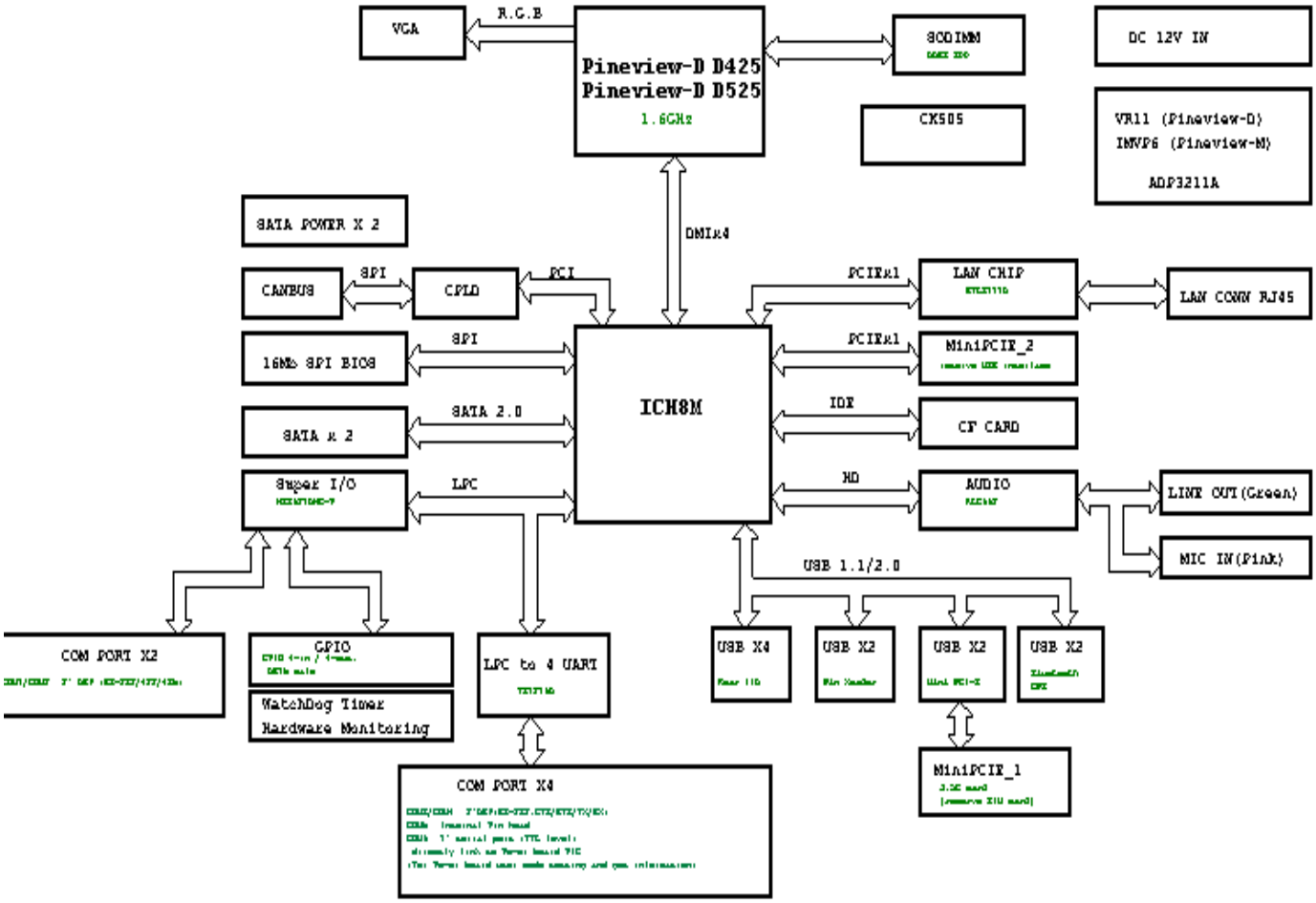
- Intel Atom D525/D425
- 1 x SO-DIMM supports DDRIII up to 4GB(Memory DDR3 data transfer rates of 800 MT/s)
- 1 x VGA
- 4 x USB2.0
- 2 x SATA
- 1 x CF II
- 4 x RS-232
- 1 x GbE
- 1 x Mic-In, 1 x Audio Out, 1 x Remote Switch
- 1 x CAN bus (Implementation ISO 11898)
- 8-bit GPIO with 4in / 4out
- Optional WiFi/ Bluetooth/ GPS/ 3.5G solution for selection
- Intelligent power management support standard 12V/24V car battery

1.2 Package Contents

Check if the following items are included in the package.

- Quick Manual
- AR-B6002
- 1 x Software Utility CD

1.3 Block Diagram

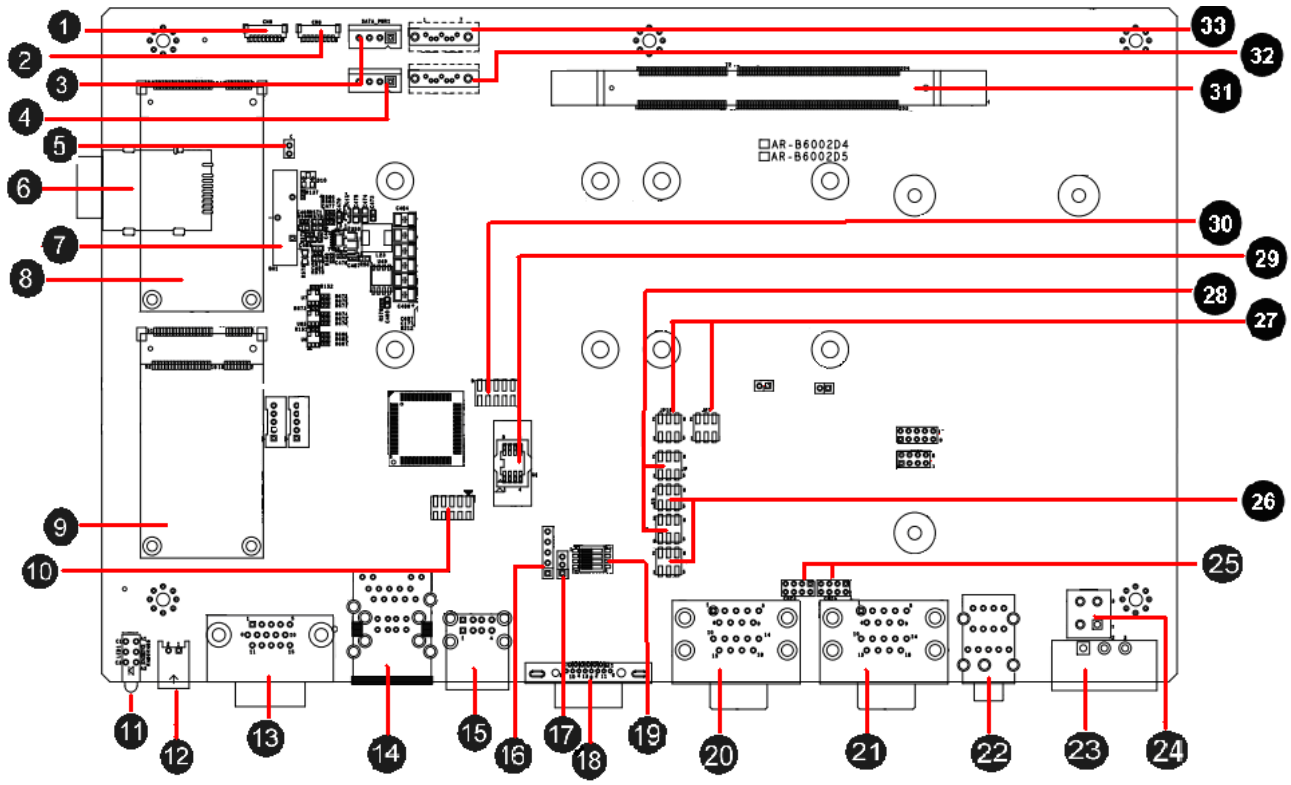


2 H/W INFORMATION

This chapter describes the installation of AR-B6002. At first, it shows the Function diagram and the layout of AR-B6002. It then describes the unpacking information which you should read carefully, as well as the jumper/switch settings for the AR-B6002 configuration

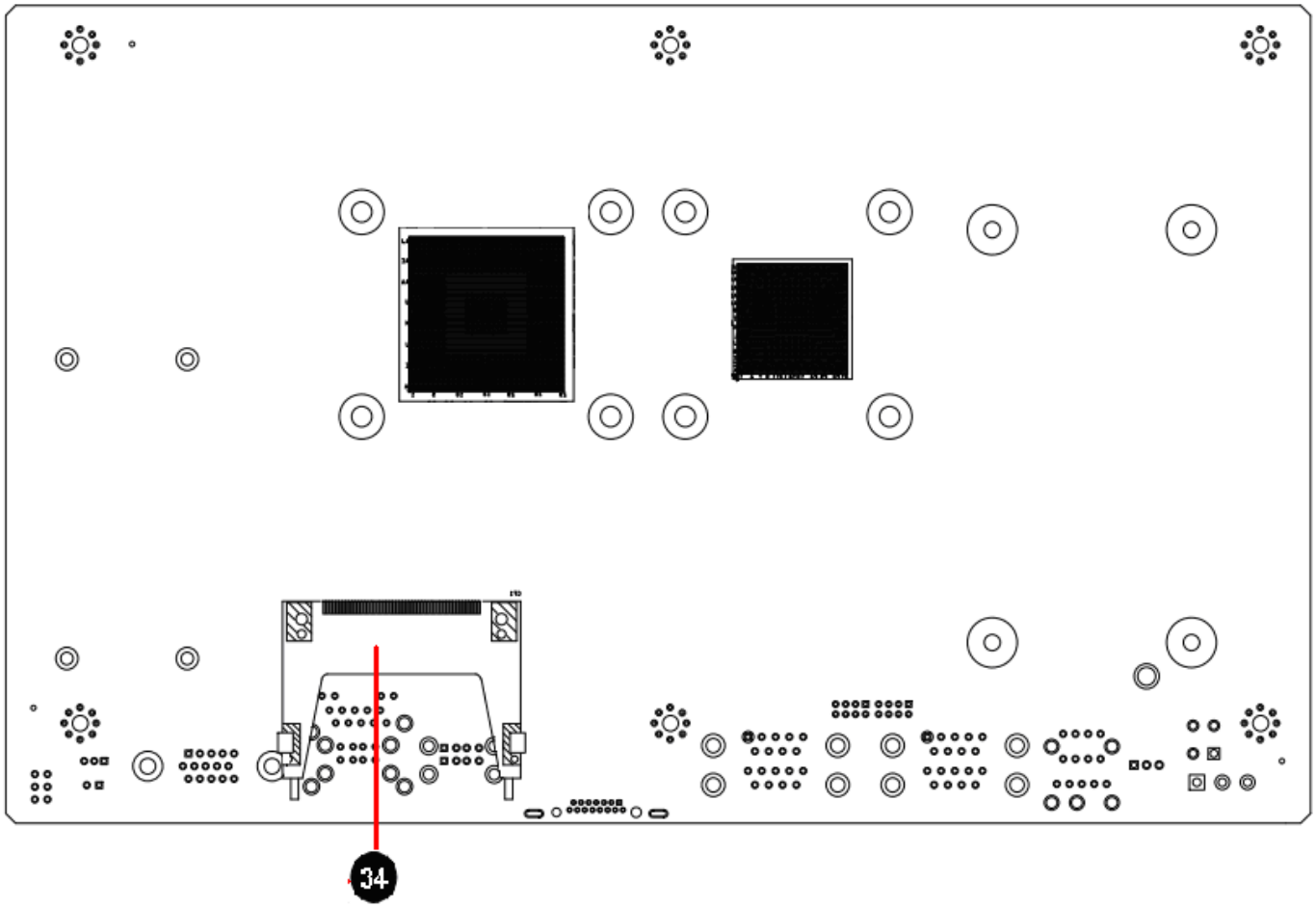
2.1 Locations of Connector and Jumper Setting

2.1.1 Locations (Top side)



1	CN6	12	CN18	23	PWR1
2	CN8	13	GPIO1	24	FUSE1
3	SATA_PWR1	14	CN5	25	CN23, CN24
4	SATA_PWR2	15	CN7	26	JP8, JP11
5	CN2	16	CN28	27	JP7, JP10
6	CN13	17	CN20	28	JP9, JP12
7	BH1	18	VGA1	29	U8
8	Minipcie1	19	SW1	30	CN21
9	Minipcie2	20	COM1 & COM2	31	DIMM1
10	CN17	21	COM3 & COM4	32	SATA1
11	LED1	22	AUDIO1	33	SATA2

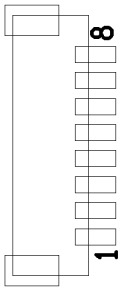
2.1.2 Locations (Bottom Side)



34	CF1

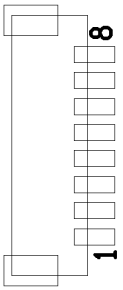
2.2 Connector and Jumper Setting Table

1. CN6: BLUETOOTH connector



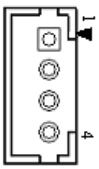
PIN	DEFINE
1	GND
2	USB_D+
3	USB_D-
4	+3.3V
5	LED
6	BT_ON
7	GND
8	+3.3V

2. CN8: GPS connector



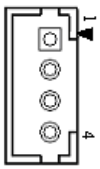
PIN	DEFINE
1	GND
2	USB_D+
3	USB_D-
4	+3.3V
5	LED
6	GPS_ON
7	GND
8	+3.3V

3. SATA_PWR1: SATA Power connector



PIN	DEFINE
1	+12V
2	GND
3	+3.3V
4	+5V

4. SATA_PWR2: SATA Power connector

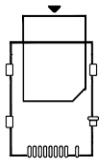


PIN	DEFINE
1	+12V
2	GND
3	+3.3V
4	+5V

5. CN2: Pin Header for clear CMOS

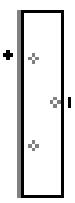
STATUS	SETTING
1-2	Clear CMOS

6. CN13: SIM Card Slot



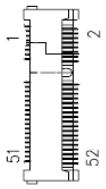
SIM Card Slot for 3G Module

7. BH1: CMOS battery holder



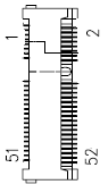
CMOS battery holder

8. MINIPCIE1: Mini PCI-E connector. (for 3.5G module)



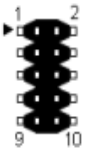
MINI PCI-E connector

9. MINIPCIE2: Mini PCI-E connector



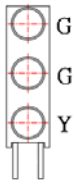
MINI PCI-E connector

10. CN17: FPGA Programmable HEADER



FPGA programmable header

11. LED1: Power State

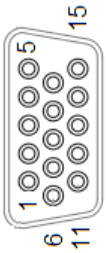


LED	SIGNAL
G	PIC LED
G	HDD LED
Y	Power LED

12. CN18: CANBUS connector

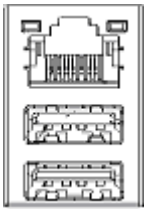
PIN	DEFINE
1	CAN_H
2	CAN_L

13. GPIO1: GPIO connector



PIN	DEFINE	PIN	DEFINE
1	GPO0	2	GPO1
3	GPO2	4	GPO3
5	GND	6	GND
7	GND	8	GND
9	GND	10	GND
11	GPI4	12	GPI5
13	GPI6	14	GPI7
15	N.C.		

14. CN5: RJ45 + USB x 2 connector



RJ45 connector for Gigabit Ethernet port #1

Upper: Port #2

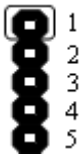
Lower: Port #1

15. CN7: USB connector

Upper: Port #4

Lower: Port #3

16. CN28: PIC Programming connector

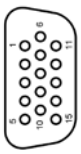


PIC programming connector

17. CN20: Setting Voltage level of Battery

STATUS	SETTING
1-2	+24V
2-3	+12V (Default)

18. VGA1: D-SUB-15 female connector for VGA output

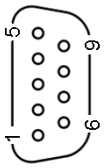


D-SUB-15 female connector for VGA output

19. SW1: DIP switch for power mode select

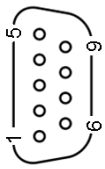
Mode	1	2	3	4
0	ON	ON	ON	ON
1	ON	ON	ON	OFF
2	ON	ON	OFF	ON
3	ON	ON	OFF	OFF
4	ON	OFF	ON	ON
5	ON	OFF	ON	OFF
6	ON	OFF	OFF	ON
7	ON	OFF	OFF	OFF
15	OFF	OFF	OFF	OFF

20. COM1 & COM2: D-SUB-9P Male connector × 2



PIN	DEFINE	PIN	DEFINE
1	DCD /DT-	2	SIN /DT+
3	SOUT /422R+	4	DTR /422R-
5	GND	6	DSR
7	RTS	8	CTS
9	RI_12V		

21. COM3 & COM4: D-SUB-9P Male connector x 2

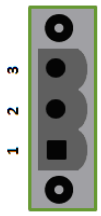


PIN	DEFINE	PIN	DEFINE
1	DCD	2	SIN
3	SOUT	4	DTR
5	GND	6	DSR
7	RTS	8	CTS
9	RI_12V		

22. AUDIO1: AUDIO connector

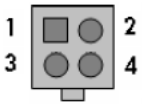
	Color	SIGNAL
1	Pink	Mic-In
2	Green	Audio Out
3	Blue	Remote Switch

23. PWR1: Power Input Terminal Block Connector



PIN	DEFINE
1	12V / 24V
2	IGN
3	GND

24. FUSE1: Fuse connector



PIN	DEFINE
1, 2	Fuse Out
3, 4	Fuse In

25. CN23: RI SELECT for COM1/2
CN24: RI SELECT for COM3/4

STATUS	CN23 SETTING	CN24 SETTING
RI# (Default)	1-2(COM1)	1-2(COM3)
+12V	3-4(COM1)	3-4(COM3)
RI# (Default)	5-6(COM2)	5-6(COM4)
+12V	7-8(COM2)	7-8(COM4)

27, 26, 28. JP7, JP8, JP9: RS-232 / RS-422 / RS-485 Selection for COM1

STATUS	JP7	JP8	JP9
RS-232 (Default)	1-2	1-3 2-4	1-3 2-4
RS-422	3-4	3-5 4-6	3-5 4-6
RS-485	5-6	3-5 4-6	N / A

27, 26, 28. JP10, JP11, JP12: RS-232 / RS-422 / RS-485 Selection for COM2

STATUS	JP10	JP11	JP12
RS-232 (Default)	1-2	1-3 2-4	1-3 2-4
RS-422	3-4	3-5 4-6	3-5 4-6
RS-485	5-6	3-5 4-6	N / A

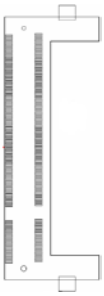
29. U8: SPI BIOS ROM

SPI BIOS ROM

30. CN21: BIOS Programmable Header

PIN	DEFINE	PIN	DEFINE
1	CS0	2	+3.3V
3	MISO	4	HOLD
5	WP	6	CLK
7	GND	8	MOSI
9	N.C.	10	N.C.

31. DIMM1: DDR-III SODIMM Socket



DDR-3 SODIMM Socket

32. SATA1: SATA device connector #1

SATA device connector #1

33. SATA2: SATA device connector #2

SATA device connector #2

34. CF1: Type-II compact flash card socket

+3.3V CF card only and UDMA mode supported

2.3 Power Subsystem

The AR-B6002 power subsystem converts the external DC input from vehicle to stable power rails for internal mother board, peripherals, and external I/O. The power subsystem can be configured by either an onboard switch SW1 or software to support various power off delay time. There are 9 power modes available for your application.

2.3.1 Definition:

1. Ignition: Ignition is a voltage input to command the power subsystem start a power on and off cycle. It is treated as ON when voltage is above 1.1 Volts and OFF as voltage is below 1.1 Volts. The maximum voltage input shall below 32 volts.
2. Remote Switch: Remote switch input is an Open/Close latch switch. When you set the power mode as 5, 6 or 7, it works with ignition to power on or off the system. It will be treated as ON when the switch is CLOSED. It will be treated as OFF when the switch is OPEN.
3. Soft Off Delay: This is the delay time after ignition or remote switch is OFF till power subsystem sends a turn off command to the motherboard. If ignition or remote switch is turned ON again during this period, the power subsystem will cancel the OFF procedure and back to operating condition.
4. Hard Off Delay: This is the delay time after power subsystem detects the OS has been shut down till the standby power is turned off.

2.3.2 Power Mode Description

- Mode0: ATX function. System will be turned on and off by the remote switch. It operates as standard PC power button.
- Mode1: AT mode, Auto PWRBTN function. The power will be ON immediately when external power present. The power will be OFF immediately when external power is disconnected.
- Mode2/3/4 (Ignition Only):

  A. Power on is controlled by **ignition (remote switch does not make any action to power on)**.

  B. Power subsystem sends “ON” command to motherboard when ignition is on for more than 2 seconds.

  C. Power subsystem will ignore the status change of ignition after ON command is sent to motherboard for 3 minutes. After this period, the Power Module will start to

check its status. This can avoid an improper “OFF” process before the OS is completely booted.

D. Power off is controlled by **ignition. Remote switch** does not make any action to power off.

E. When Ignition is turn off, Power subsystem sends “OFF” pulse to motherboard after Soft Off delay.

F. Power subsystem will ignore the status change of ignition during the “OFF” command is sent out and OS is completely shut down. This will avoid an improper ON process before the motherboard is completely shot off.

G. The system can be turned on again during Hard off delay period if the OFF procedure already finished and the ignition is ON again.

- Mode 5/6/7 (Ignition + remote Switch):

A. Power on is controlled by **remote switch (ignition must be turned on before pressing the remote switch)**.

B. Power subsystem sends “ON” command to motherboard when Remote switch is on for more than 2 seconds.

C. Power subsystem will ignore the status change of ignition after ON command is sent to motherboard for 3 minutes. After this period, the Power Module will start to check its status. This can avoid an improper “OFF” process before the OS is completely booted.

D. Power off is controlled by remote switch or ignition.

E. Power subsystem will ignore the status change of ignition and remote switch during the “OFF” command is sent out and OS is completely shut down. This will avoid an improper ON process before the motherboard is completely shot off.

F. The system can be turned on again if the OFF procedure already finished and ignition or remote switch is ON again.

- Mode 15: Software programmable mode. You can set the Soft Off Delay time, Hard Off Delay time and Power ON source by software Application Program Interface. Please refer to Chapter 4 for details.
- Others modes are reserved for test only.

Mode description:

Mode	Soft OFF Delay	Hard OFF delay	Power ON Control	Power OFF Control
0 (ATX)	No	No	By target board power button	By target board power button
1(AT)	No	No	DC on	DC off
2	5 seconds	1 minute	Ignition	Ignition
3	1 minute	5 minutes	Ignition	Ignition
4	30 minutes	2 hours	Ignition	Ignition
5	5 seconds	1 minute	Remote Switch (Ignition must be on first)	Ignition / Remote Switch
6	1 minute	5 minutes	Remote Switch (Ignition must be on first)	Ignition / Remote Switch
7	30 minutes	2 hours	Remote Switch (Ignition must be on first)	Ignition / Remote Switch
15 (Software control)	By user setting	By user setting	By user setting	Ignition / Remote Switch

Low power protection:

Power input monitoring(before system boot on, during runtime, during soft off delay): The Power smart function will constantly monitor the input voltage. If the input voltage is below **X Voltage (the standard might have 5% tolerance)**, the Smart Mode will not start the power on procedure. When Power smart function has ran in operation and the battery drops below **Y Voltage (with 5% tolerance)** more than 10 seconds the Power smart function will shut down the motherboard following the standard shut down procedure. If the input voltage recovers in 10 seconds over **Y Voltage (with 5% tolerance)** again, the Power smart function will continue to run. (Figure 4) if this happens, ignition shall be off and on again (Mode 2, 3, 4) or press the remote switch(Mode 5,6,7) if you want to turn on system again.

Important: Please make sure the CN20 jumper is set to the right setting which meet your vehicle power system. The power subsystem uses this setting to identify the voltage of your vehicle power system.

STATUS	SETTING
1-2	+24V system
2-3	+12V system (Default).

	For 12V car battery	For 24V car battery
X value (Minimum Start up voltage)	**11.2**	**23**
Y value (Auto shut down voltage)	**10.8**	**22.5**

2.4 Remote Switch

We provide a remote switch cable with latch switch. Use the remote switch cable can let user turn on and turn off system easier.

2.5 Status LED

The LED will flash a number of blink to state the status.

Mode 0 and 1:

LED will be constant ON when power output is ON. LED will be constant OFF when power output is off.

Mode 2 to 7 and mode 15(Smart ATX mode):

Each blink remains 500 milliseconds ON followed by a 500 ms OFF. Each Cycle will have a 5-second OFF in between.

Flashing Number	Status
0 (constant ON)	Power Output runs normally
1	Hard off mode
2	Standby mode (After power output is turned off until 5VSB is turned off)
3	Power soft off delay. (After ignition is turned off or remote switch is pressed until power output is turned off.)
4	Battery voltage low
5	System on/off fail. When motherboard cannot turn on or turn off after retry.

6	Mode 8 / 9 / 10 / 11 / 12 / 13 / 14, which means no function in current version.
6-128	Reserved

2.6 Fuse selection

AR-B6002 has external fuse holder, user can swap fuse according to the application. We provide 7.5A fuse for 12V car battery, so that user's cable should be able to endure 7.5A at least.

2.7 COM1 / 2 to choose RS-232/RS-485/RS-422 by jumper setting

- JP7, JP8, JP9 setting to COM1
- JP10, JP11, JP12 setting to COM2

COM1 Type Selection

	JP7	JP8	JP9
RS-232	1 – 2	1 – 3 2 – 4	1 – 3 2 – 4
RS-422	3 – 4	3 – 5 4 – 6	3 – 5 4 – 6
RS-485	5 – 6	3 – 5 4 – 6	N / A

COM2 Type Selection

	JP10	JP11	JP12
RS-232	1 – 2	1 – 3 2 – 4	1 – 3 2 – 4
RS-422	3 – 4	3 – 5 4 – 6	3 – 5 4 – 6
RS-485	5 – 6	3 – 5 4 – 6	N / A

2.8 GPIO

GPO: Pin 1, Pin 2, Pin 3, Pin 4
Output voltage range: 5V~30V
Sink Current: Maximum 500mA each channel
Output Default set: Low

GPI: Pin 11, Pin 12, Pin 13, Pin 14
Logic High: 3V~32V
Logic Low: 0V~1.5V

3 BIOS SETTING

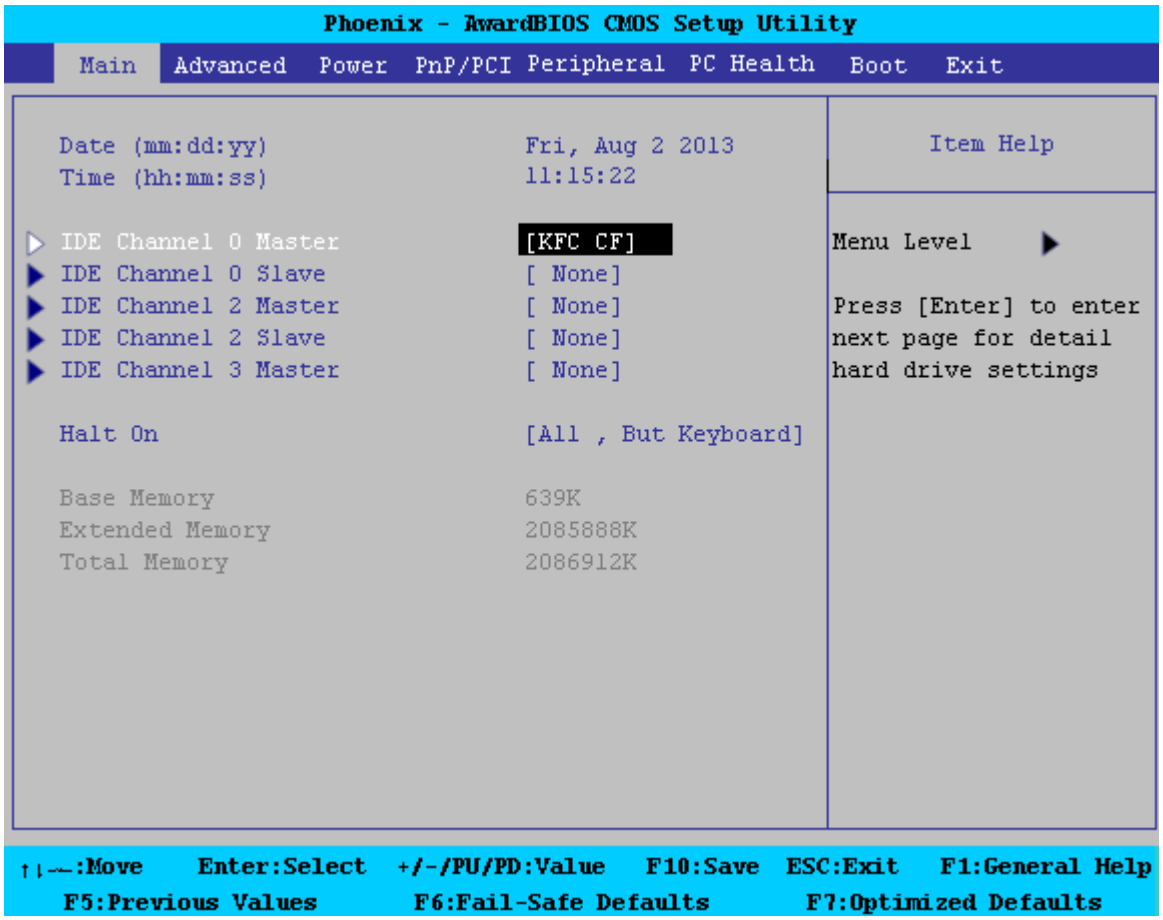
This chapter describes the BIOS menu displays and explains how to perform common tasks needed to get the system up and running. It also gives detailed explanation of the elements found in each of the BIOS menus. The following topics are covered:

- Main Setup
- Advanced Setup
- Power Setup
- PnP/PCI Setup
- Peripherals Setup
- PC Health Setup
- Boot Setup
- Exit Setup

Once you enter the Award BIOS™ CMOS Setup Utility, the Main Menu will appear on the screen. Use the arrow keys to highlight the item and then use the <Pg Up> <Pg Dn> keys to select the value you want in each item.

3.1 Main Setup

The BIOS setup main menu includes some options. Use the [Up/Down] arrow key to highlight the option, and then press the [Enter] key to select the item and configure the functions.


Phoenix - AwardBIOS CMOS Setup Utility
Main Advanced Power PnP/PCI Peripheral PC Health Boot Exit
Date (mm:dd:yy) Fri, Aug 2 2013
Time (hh:mm:ss) 11:15:22
IDE Channel 0 Master [KFC CF]
IDE Channel 0 Slave [None]
IDE Channel 2 Master [None]
IDE Channel 2 Slave [None]
IDE Channel 3 Master [None]
Halt On [All , But Keyboard]
Base Memory 639K
Extended Memory 2085888K
Total Memory 2086912K
Item Help
Menu Level
Press [Enter] to enter next page for detail hard drive settings
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F6:Fail-Safe Defaults F7:Optimized Defaults

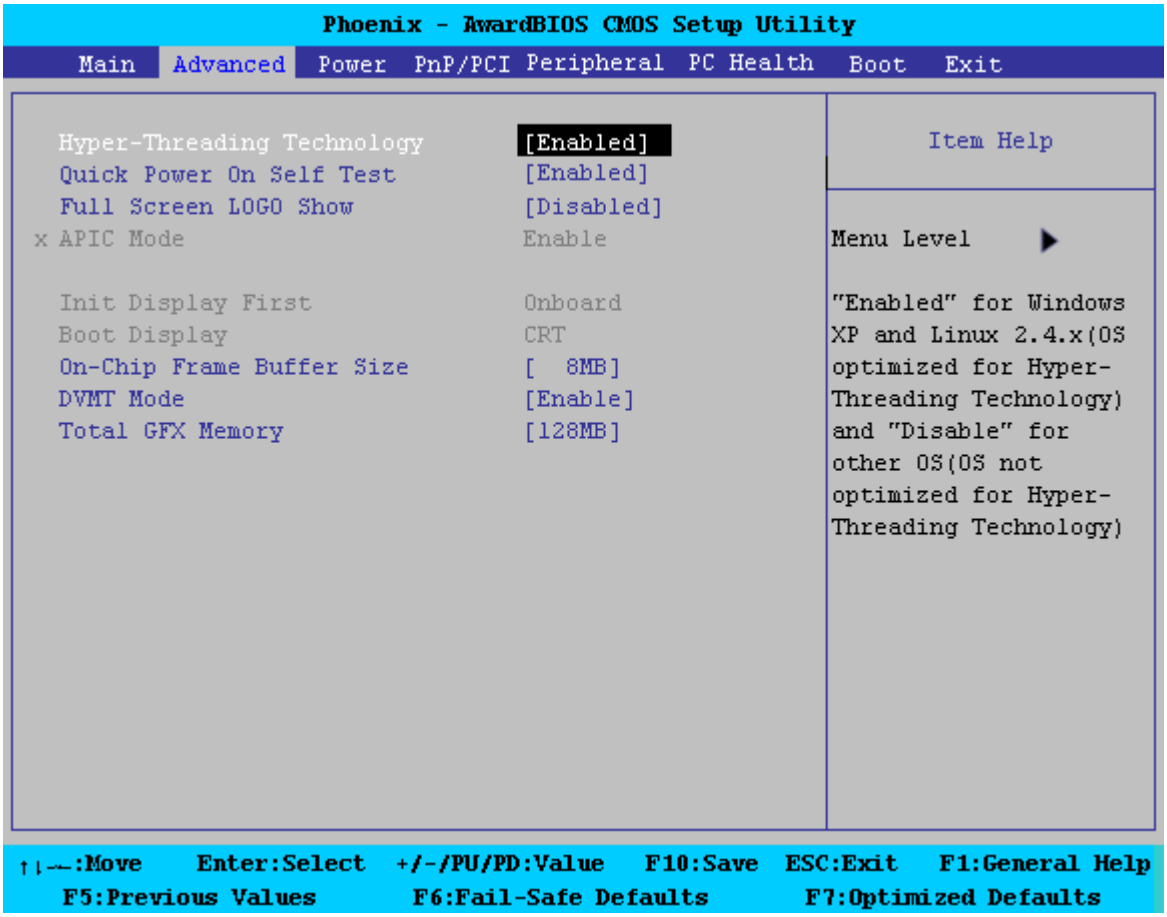
Note: The control keys are listed at the bottom of the menu. If you need any help with the item fields, you can press the <F1> key, and the relevant information will be displayed.

Item	Option	Description
System Date	Format : MM/DD/YYYY (month/day/year)	Set the system date. Note that the 'Day' automatically changes when you set the date.
System Time	Format: HH:MM:SS (hour:minute:second)	Set the system time.

IDE Channel 0 Master/Slave	N/A	The onboard SATA Ports support user connecting up to 2 SATA HDD. The first SATA Port is the “IDE Channel 0 Master” and the second is “IDE Channel 1 Master”. BIOS will auto-detect the HDD type.
Halt On	All Errors, No Errors, All but keyboard.	Select the situation in which you want the BIOS to stop the POST process and notify you.

3.2 Advanced Setup

This section consists of configuration entries that allow you to improve your system performance, or modify some system features according to your preference. Some entries are required and reserved by the board's design.

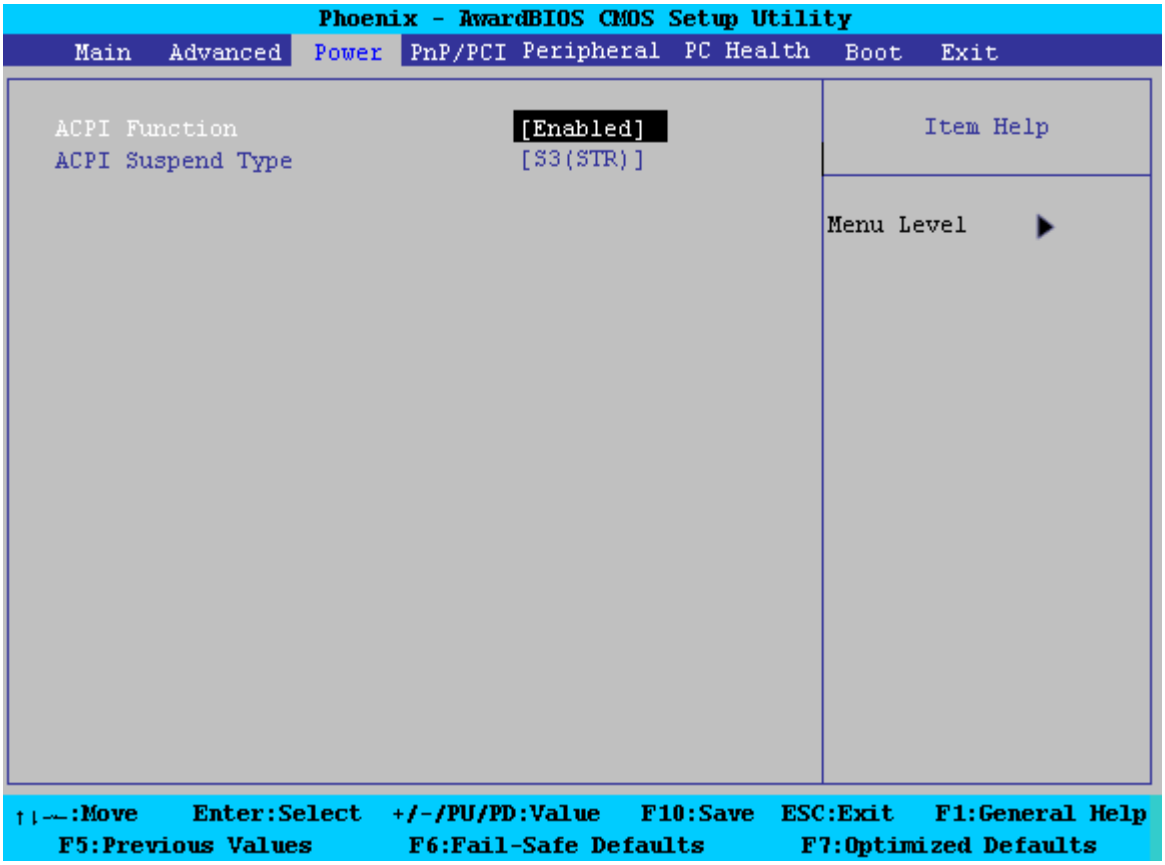

Phoenix - AwardBIOS CMOS Setup Utility
Main Advanced Power PnP/PCI Peripheral PC Health Boot Exit
Hyper-Threading Technology [Enabled]
Quick Power On Self Test [Enabled]
Full Screen LOGO Show [Disabled]
x APIC Mode Enable
Init Display First Onboard
Boot Display CRT
On-Chip Frame Buffer Size [8MB]
DVMT Mode [Enable]
Total GFX Memory [128MB]
Item Help
Menu Level
"Enabled" for Windows XP and Linux 2.4.x(OS optimized for Hyper-Threading Technology) and "Disable" for other OS(OS not optimized for Hyper-Threading Technology)
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F6:Fail-Safe Defaults F7:Optimized Defaults

Note: The control keys are listed at the bottom of the menu. If you need any help with the item fields, you can press the <F1> key, and the relevant information will be displayed.

Option	Choice	Description
Hyper-Threading Technology	Enabled Disabled	Enable for Windows XP and Linux Disable for other OS.

Quick Power On Self Test	Enabled Disabled	This category speeds up the Power On Self Test (POST) after you have powered on the computer. If it is set to Enabled, the BIOS will shorten or skip some check items during POST.
Full Screen Logo Show	Enabled Disabled	Select Enabled to show the full screen logo if you have an add-in BIOS.
On-Chip Frame Buffer Size	1Mb 8Mb	This Item is for setting the Frame Buffer (Share system memory as display memory).
DVMT mode	Enabled Disabled	This item sets the mode for dynamic video memory technology
Total GFX Memory	128MB 256MB MAX	This item sets the mode for GFX video memory

3.3 Power Setup

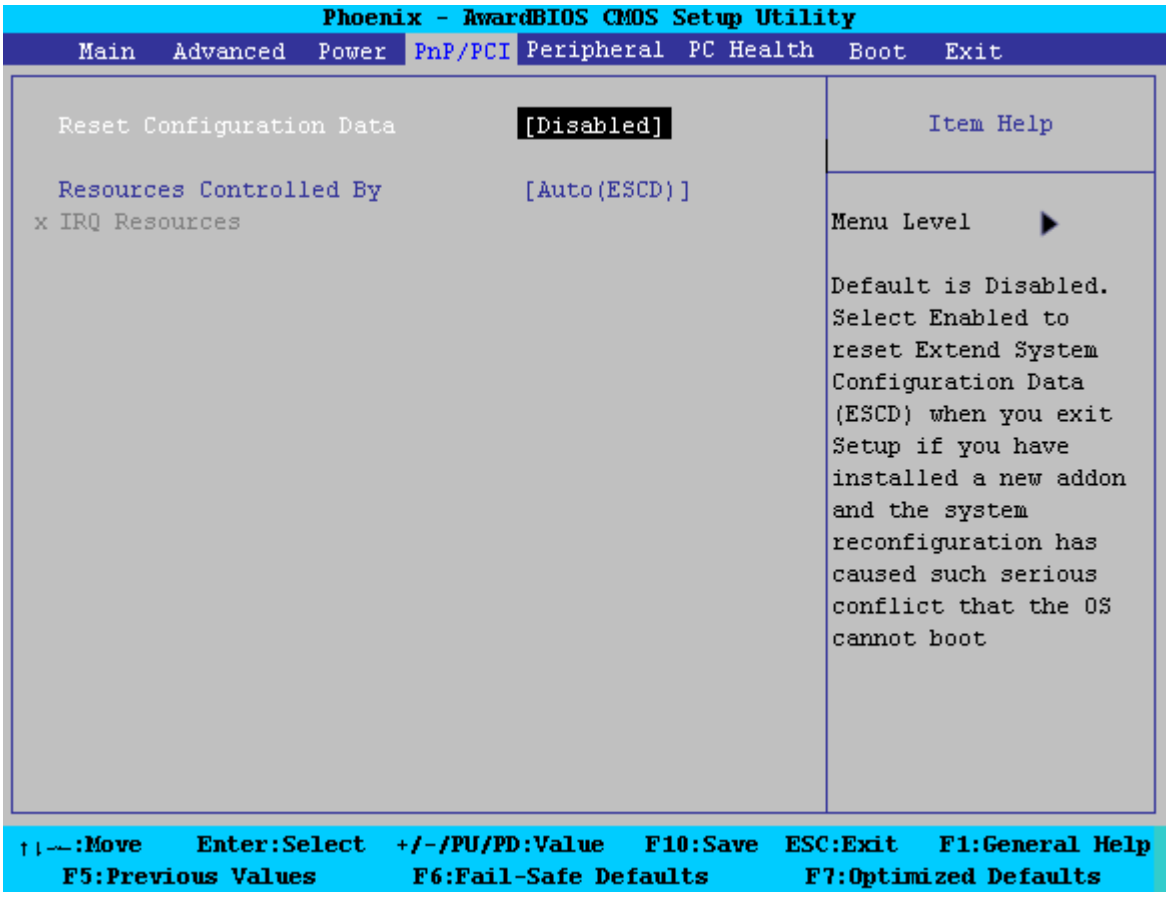

Phoenix - AwardBIOS CMOS Setup Utility
Main Advanced Power PnP/PCI Peripheral PC Health Boot Exit
ACPI Function [Enabled]
ACPI Suspend Type [S3(STR)]
Item Help
Menu Level
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F6:Fail-Safe Defaults F7:Optimized Defaults

Note: The control keys are listed at the bottom of the menu. If you need any help with the item fields, you can press the <F1> key, and the relevant information will be displayed.

Item	Option	Description
ACPI Function	Enabled	ACPI System Support
ACPI Suspend Type	S3 S1	ACPI S1/S3 Sleep State.

3.4 PnP/PCI Setup

The option configures the PCI bus system. All PCI bus system on the system use INT#, thus all installed PCI cards must be set to this value.


Phoenix - AwardBIOS CMOS Setup Utility
Main Advanced Power PnP/PCI Peripheral PC Health Boot Exit
Reset Configuration Data [Disabled]
Resources Controlled By [Auto(ESCD)]
x IRQ Resources
Item Help
Menu Level
Default is Disabled. Select Enabled to reset Extend System Configuration Data (ESCD) when you exit Setup if you have installed a new addon and the system reconfiguration has caused such serious conflict that the OS cannot boot
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F6:Fail-Safe Defaults F7:Optimized Defaults

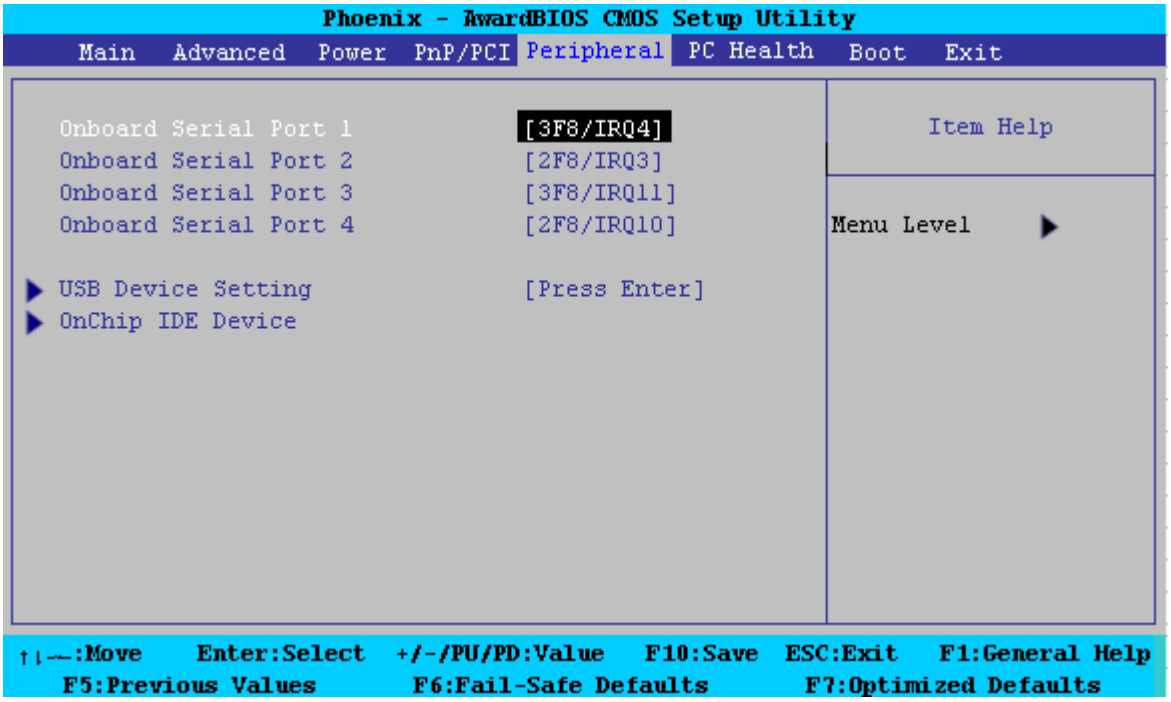
Note: The control keys are listed at the bottom of the menu. If you need any help with the item fields, you can press the <F1> key, and the relevant information will be displayed.

Item	Option	Description
Reset Configuration Data	Enabled Disabled	Normally, you leave this field Disabled. Select Enabled to reset Extended System Configuration Data (ESCD) when you exit Setup. If you have installed a new add-on and the system reconfiguration has caused such a serious conflict, then the operating system cannot boot.

Resources Controlled By	Auto(ESCD) Manual	The Award Plug and Play BIOS has the capacity to automatically configure all of the boot and Plug and Play compatible devices. However, this capability means absolutely nothing unless you are using a Plug and Play operating system such as Windows 95. If you set this field to “manual,” then you may choose specific resources by going into each of the submenus.
IRQ Resources	N/A	When resources are controlled manually, assign a type to each system interrupt, depending on the type of the device that uses the interrupt

3.5 Peripherals Setup

This option controls the configuration of the board's chipset. Control keys for this screen are the same as for the previous screen.

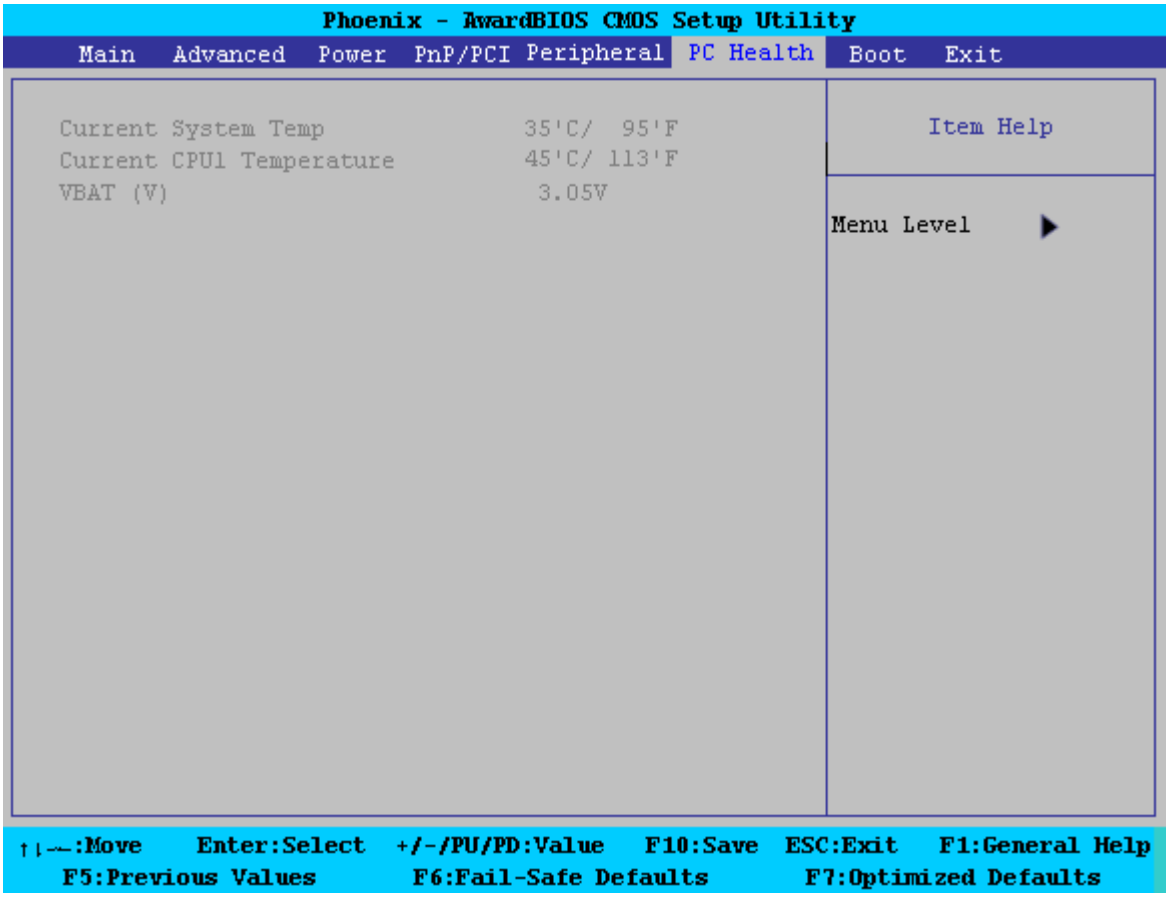

Phoenix - AwardBIOS CMOS Setup Utility
Main Advanced Power PnP/PCI Peripheral PC Health Boot Exit
Onboard Serial Port 1 [3F8/IRQ4]
Onboard Serial Port 2 [2F8/IRQ3]
Onboard Serial Port 3 [3F8/IRQ11]
Onboard Serial Port 4 [2F8/IRQ10]
USB Device Setting [Press Enter]
OnChip IDE Device
Item Help
Menu Level
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F6:Fail-Safe Defaults F7:Optimized Defaults

Note: The control keys are listed at the bottom of the menu. If you need any help with the item fields, you can press the <F1> key, and the relevant information will be displayed.

Option	Choice	Description
Onboard Serial Port 1 **Onboard Serial Port 2** **Onboard Serial Port 3** **Onboard Serial Port 4**	Serial Port 1: 3F8 / IRQ4 Serial Port 2: 2F8 / IRQ3 Serial Port 3: 3E8 / IRQ11 Serial Port 4: 2E8 / IRQ10	Select an address and the corresponding interrupt for each serial port.
USB Device Setting	N/A	Select your system contains a Universal Serial Bus (USB) controller and you have USB peripherals.
OnChip IDE DEVICE	N/A	The integrated peripheral controller contains an IDE interface with support for two IDE channels.

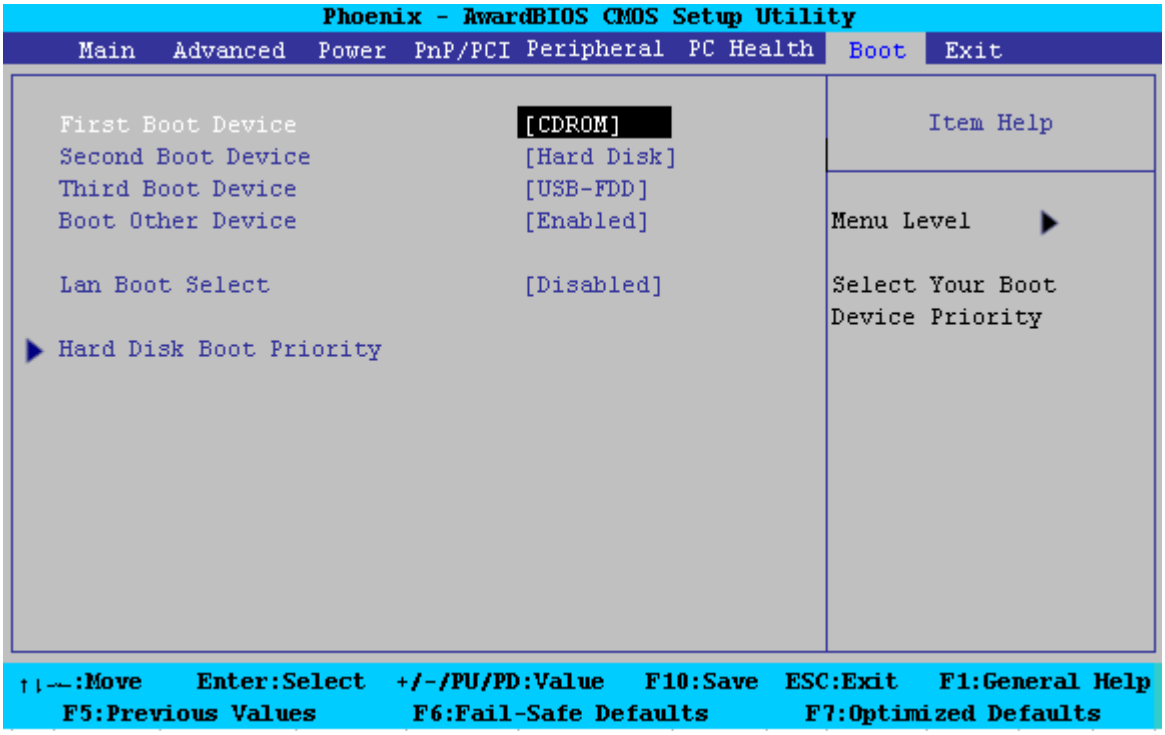
3.6 PC Health Setup

This section shows the parameters in determining the PC Health Status. These parameters include temperatures, fan speeds, and voltages.


Phoenix - AwardBIOS CMOS Setup Utility
Main Advanced Power PnP/PCI Peripheral PC Health Boot Exit
Current System Temp 35'C/ 95'F
Current CPUl Temperature 45'C/ 113'F
VBAT (V) 3.05V
Item Help
Menu Level
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F6:Fail-Safe Defaults F7:Optimized Defaults

3.7 Boot Setup

This option allows user to select sequence/priority of boot device(s) and Boot from LAN.

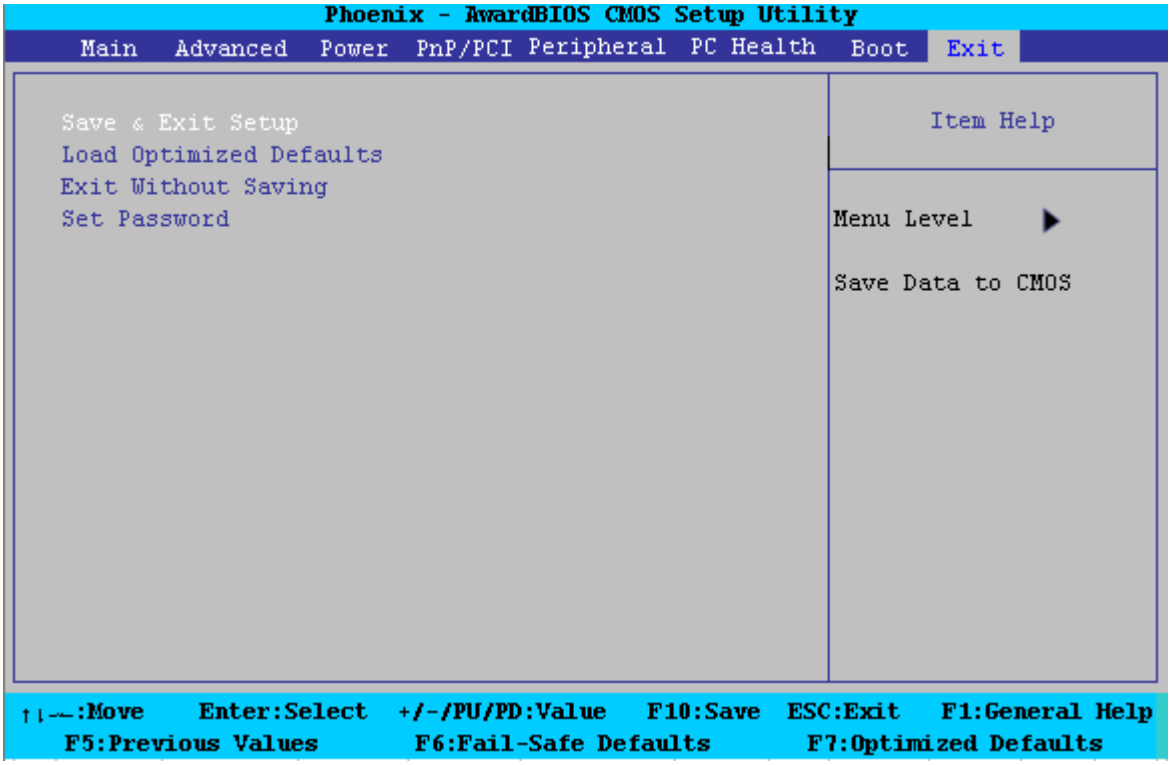

Phoenix - AwardBIOS CMOS Setup Utility
Main Advanced Power PnP/PCI Peripheral PC Health Boot Exit
First Boot Device [CDROM]
Second Boot Device [Hard Disk]
Third Boot Device [USB-FDD]
Boot Other Device [Enabled]
Lan Boot Select [Disabled]
Hard Disk Boot Priority
Item Help
Menu Level
Select Your Boot Device Priority
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F6:Fail-Safe Defaults F7:Optimized Defaults

Note: The control keys are listed at the bottom of the menu. If you need any help with the item fields, you can press the <F1> key, and the relevant information will be displayed.

Option	Choice	Description
First / Second / Third Boot Device/Other Boot Device	Hard Disk CDROM USB-FDD USB-CDROM LAN Disabled	The BIOS attempts to load the operating system from the devices in the selected sequence.
LAN Boot Select	Enabled Disabled	These fields allow the system to search for an OS from LAN.
Hard Disk Boot Priority	N/A	These fields set the Boot Priority for each Hard Disk.

3.8 Exit Setup

This option is used to exit the BIOS main menu and change password.


Phoenix - AwardBIOS CMOS Setup Utility
Main Advanced Power PnP/PCI Peripheral PC Health Boot Exit
Save & Exit Setup
Load Optimized Defaults
Exit Without Saving
Set Password
Item Help
Menu Level
Save Data to CMOS
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F6:Fail-Safe Defaults F7:Optimized Defaults

Note: The control keys are listed at the bottom of the menu. If you need any help with the item fields, you can press the <F1> key, and the relevant information will be displayed.

Option	Choice	Description
Save & Exit Setup	Press <Enter> on this item to confirm: **Save to CMOS and EXIT (Y/N)? Y**	Press “Y” to store the selections made in the menus in CMOS – a special section of the memory that stays on after you turn your system off. The next time you boot your computer, the BIOS configures your system according to the setup selections stored in CMOS. After saving the values, the system will restart.

Load Optimized Defaults	When you press <Enter> on this item, you will see a confirmation dialog box with a message like this: **Load Optimized Defaults (Y/N)? N**	Press 'Y' to load the default values that are factory-set for optimal-performance system operations.
Exit Without Saving	Press <Enter> on this item to confirm: **Quit without saving (Y/N)? Y**	This allows you to exit Setup without storing any changes in CMOS. The previous selections remain in effect. This will exit the Setup utility and restart your computer.
Set Password	Press <Enter> on this item to confirm: **ENTER PASSWORD:**	When a password has been enabled, you will be prompted to enter your password every time you try to enter Setup. This prevents unauthorized persons from changing any part of your system configuration. Type the password, up to eight characters in length, and press <Enter>. The password typed now will clear any previous password from the CMOS memory. You will be asked to confirm the password. Type the password again and press <Enter>. You may also press <Esc> to abort the selection and not enter a password. To disable a password, just press <Enter> when you are prompted to enter the password. A message will confirm that the password will be disabled. Once the password is disabled, the system will boot and you can enter Setup freely.

4 SOFTWARE INSTALLATION & PROGRAMMING GUIDE

4.1 Introduction

4.1.1 CAN bus

Overview

The CAN bus APIs provide interfaces to CAN bus subsystem. By invoking these APIs, programmers can implement applications which have the functions listed below:

- Set the BAUD rate.
- Send the CAN packages over the CAN bus.
- Receive the CAN packages via the CAN bus hardware interface.
- Set receive mode to normal, STD only, EXTD only, or any.
- Set mask
- Get mask
- Set filter
- Get filter

In this CAN bus API package, we provides:

1. On Linux platform:
   Linux driver module of CAN bus subsystem and the driver install / uninstall scripts.

   On Windows platform:
   We provide device driver and install program of CAN bus subsystem.
2. API header file.
   API libraries is static library format and shared library format.
3. CAN bus test utility.

Installation Procedure of CAN Bus Driver

On Linux platform:

1. Change to the ‘root’ user account.

```
[Test@RD-System ~]$ su
Password:                    <<< key in admin password
[root@RD-System Test]#
```

2. In the ‘driver’ directory, execute the script ‘install’.

```
[root@RD-System driver]# ./install
```

3. Make sure ‘arb6002’ is in the module list.

```
[root@RD-System driver]# lsmod
Module                  Size  Used by
arb6002                85504   0
vfat                    8744   1
```

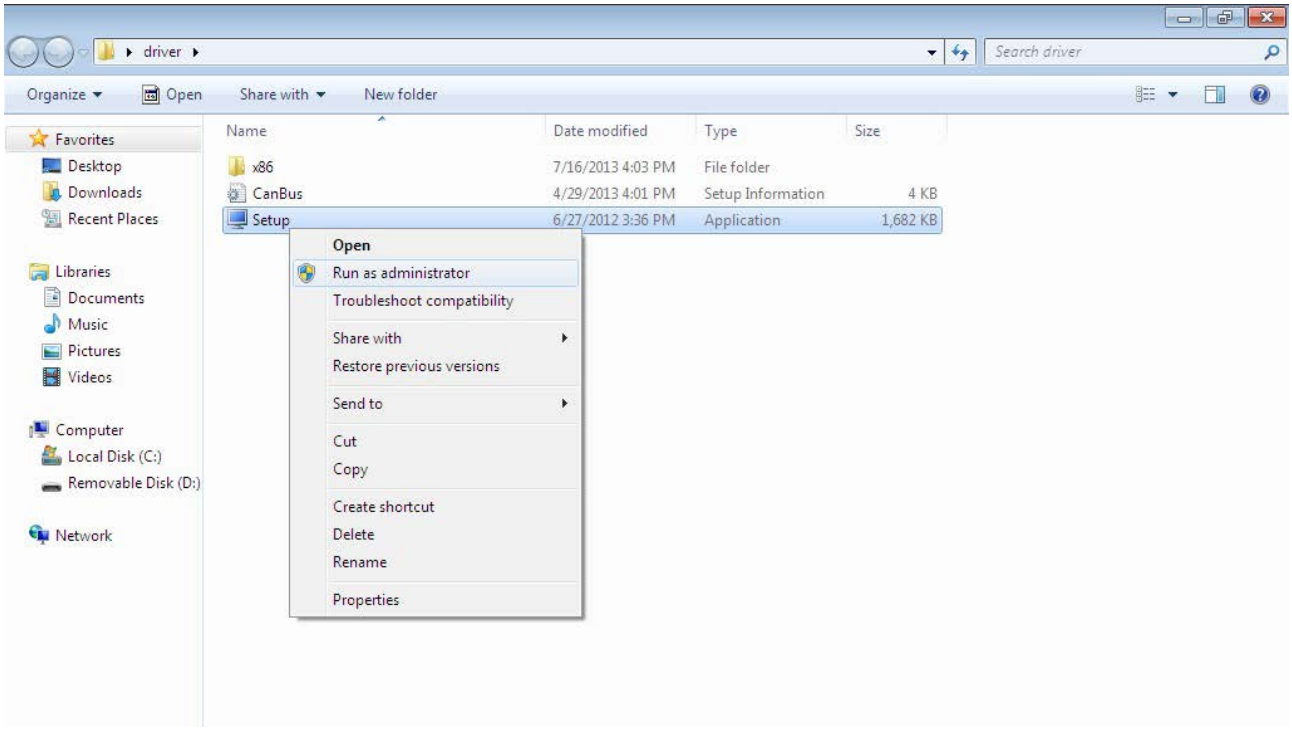
4. If the driver is no longer needed, execute the script ‘uninstall’ to unload the driver.

```
[root@RD-System
```

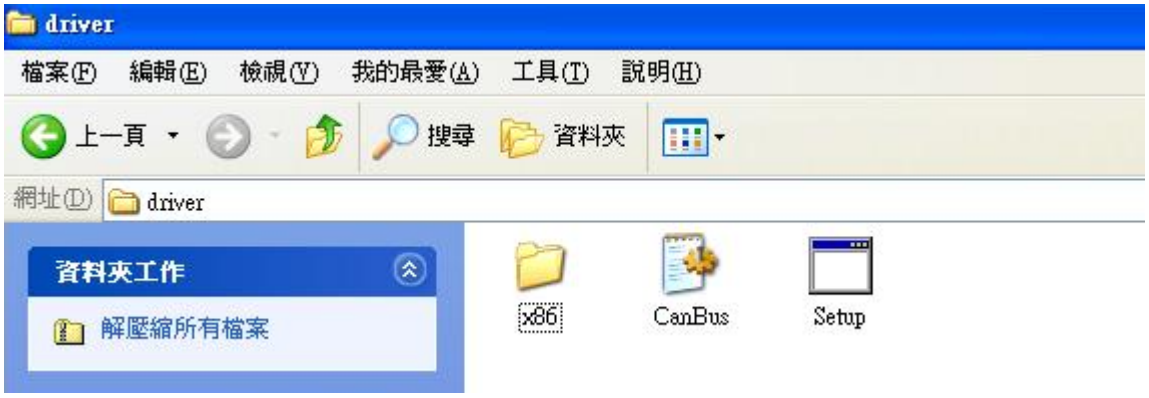
On Windows platform:

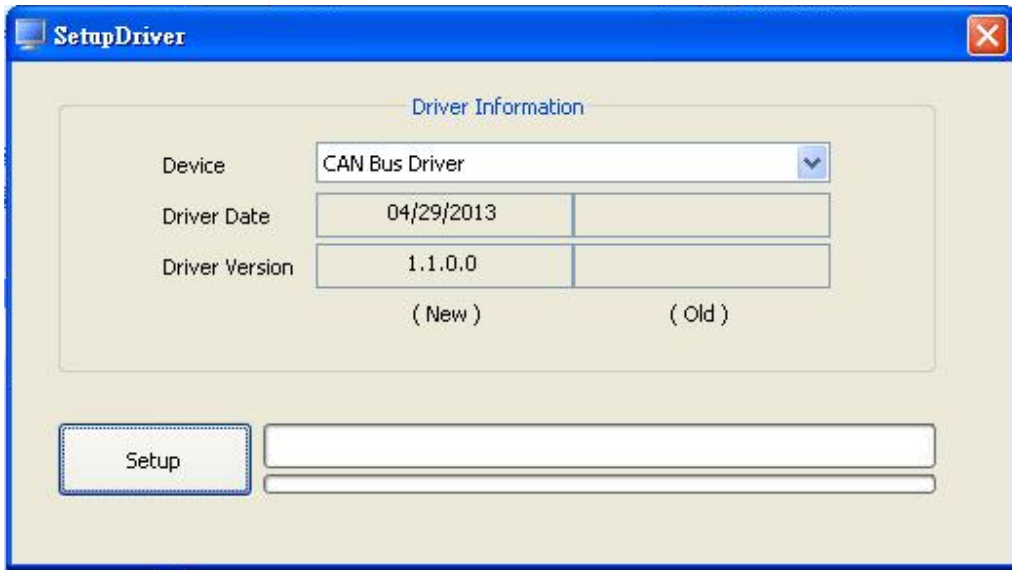
1. In the driver directory, execute the ‘setup.exe’ program.

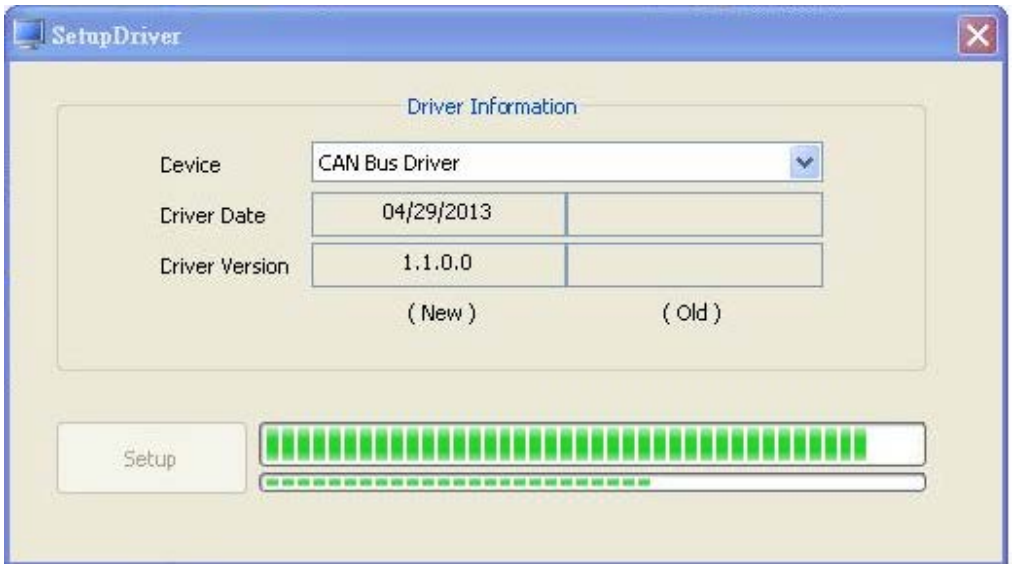
   Note: For Windows 7 and Vista, please run this program as administration. The following diagram is for your reference.



The following diagram is copied for Windows XP for your reference.







The CAN bus APIs

Before executing the applications which invoke the CAN bus APIs, users should make sure that the Linux device driver or the Windows device driver of CAN bus has been installed.

On Linux platform, after successfully installing the device driver, a character device node named “/dev/can0” will be created automatically. The APIs open the device node “/dev/can0” implicitly so acquiring a file descriptor of “/dev/can0” by users is not necessary. In order not to degrade the performance of the CAN bus subsystem, the device node “/dev/can0” is limited to be opened at most once at any moment, i.e., if application A accesses CAN bus via the APIs, the application B which either tries to open ‘/dev/can0’ or uses CAN bus API will result in failure.

On Windows platform, after successfully installing the device driver, there is a device which shows ‘CAN Bus Driver’ in the ‘Device Manager’. The APIs on Windows platform open this device implicitly. User can call the APIs directly without opening the CAN Bus subsystem device.

CAN Message Format

```
// TPE DEFINE
typedef     char              i8;
typedef     unsigned char     u8;
typedef     short             i16;
typedef     unsigned short    u16;
typedef     unsigned long     u32;
typedef     int               i32;

 typedef    struct {
  i32                   flags;
  i32                   cob;
  u32                   id;
  struct timeval        timestamp;
  i16                   length;
  u8                    data[8];
} canmsg_t;
```

To transmit a CAN package, the programmer has to fill in the fields in the variable of type canmsg_t and pass this canmsg_t variable as an argument to invoke the APIs. The fields in CAN message are described below:

flags:

This field holds the information of message type. Programmers can set the message type as:

1. Standard Data Frame:

```
canmsg_t msg;    // Declare a variable ‘msg’ of type ‘canmsg_t’
msg.flags = 0;    // Setting the flags field to 0 defines the ‘msg’ as an
                  // ordinary standard data frame.
```

2. Extended Data Frame:

```
canmsg_t msg;
msg.flags = 1 // flags field to 1 defines the ‘msg’ as an
                  //extend data frame.
```

cob:

This field is reserved for holding a message communication object number.

id:

CAN message ID.

timestamp:

When a CAN package is received, the CAN device driver will annotate a timestamp to the timestamp field in the canmsg_t variable and return this canmsg_t variable to the caller.

length:

The number of the data bytes which are sent or received in the ‘data’ field of CAN message. This field is necessary while transmitting a Standard or Extended Data Frame. Programmers have to explicitly set up this field. The length of data is 0~8.
For example:

```
canmsg_t msg;

msg.data[0] = 0xa1;
msg.data[1] = 0xb2;
 msg.data[2] = 0xc3;

 msg.length = 3;
```

data:

The byte array holds the message data.

4.1.2 GPIO and Watchdog

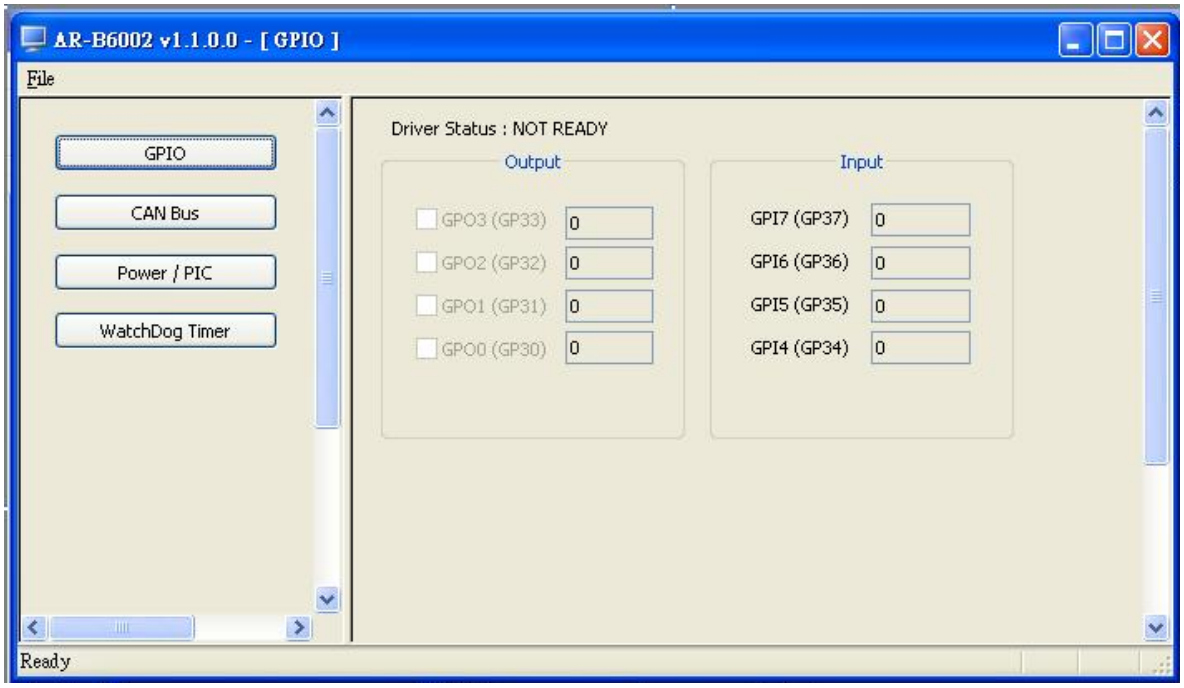
Overview

AR-B6002 provides both a GPIO interface and a Watchdog timer. Users can use the GPIO and Watchdog APIs to configure and to access the GPIO interface and the Watchdog timer. The GPIO has four input pins and four output pins. The Watchdog timer can be set to 1~255 seconds. Setting the timer to zero disables the timer. The remaining seconds of the timer to reboot can be read from the timer.

In this GPIO and Watchdog package, on Linux and Windows platform, we provide:

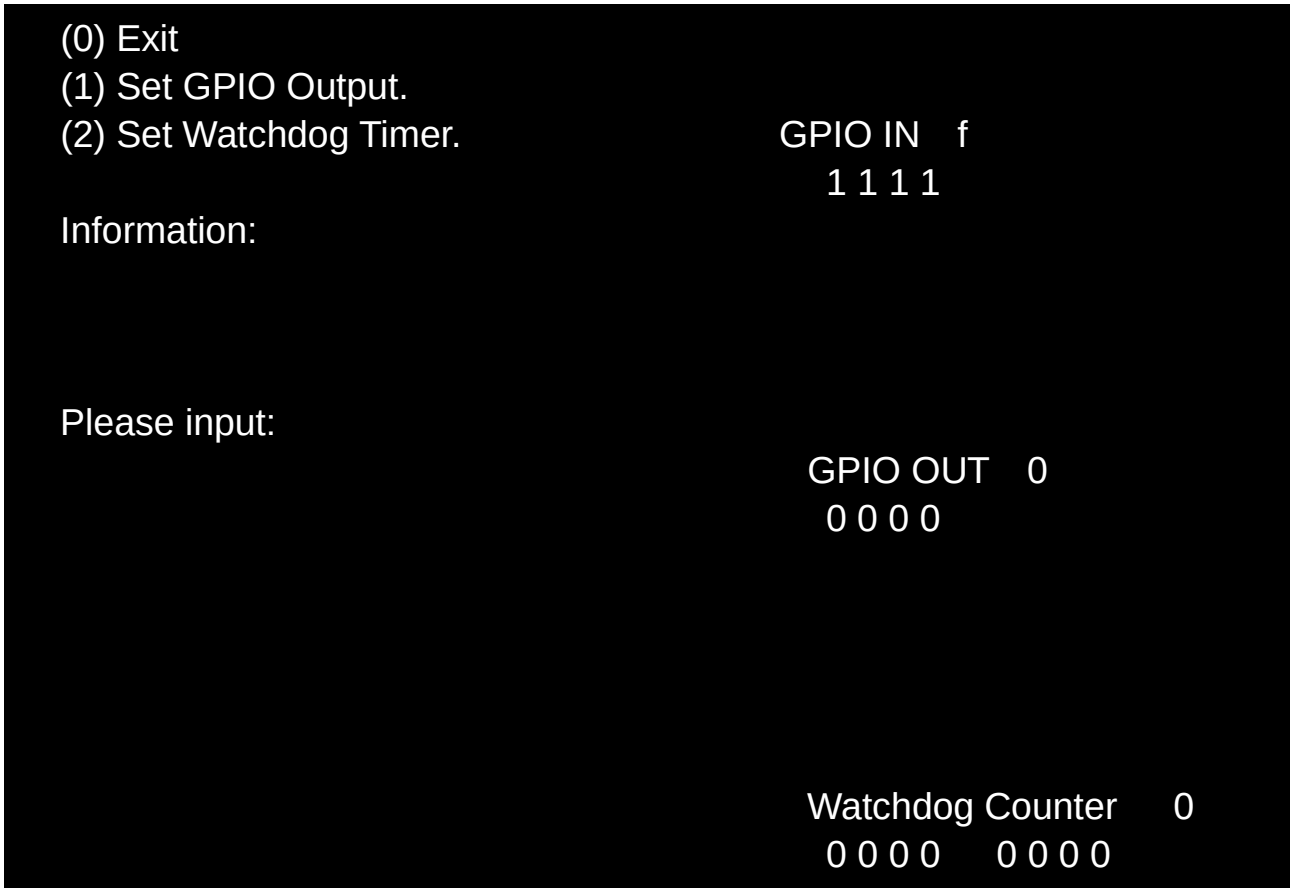
GPIO and Watchdog test utility.

P.S. The following is Windows reference pictures about the utility file:



P.S. The following is Linux reference pictures about the utility file:

```
[root@RD-System ap_and_lib]# cd gpio_watchdog
[root@RD-System gpio_watchdog]# ls
libSioAcce.a  libSioAcce.so  main.c  sio_acce.h  sio_utility
[root@RD-System gpio_watchdog]# ./sio_utility
```



4.1.3 Power Subsystem

Overview

When the AR-B6002 is at Power Mode 15, the Power Subsystem APIs can be used to get and set the configuration of power subsystem. By invoking the Power Subsystem APIs, the users can:

1. Get the current status of ignition (ON or OFF).
2. Set the Power-On mode. This setting will be kept in the power subsystem and will take effect at next system boot.
3. From the power subsystem, get the stored setting of Power-On mode.
4. Get or set the time of Hard Off delay in seconds or in minutes.
5. Get or set the time of Soft Off delay in seconds or in minutes
6. Get the battery voltage.
7. Get the version number of the firmware of the Power Subsystem.
8. Set the Hard Off delay and Soft Off delay to the default value.

The power subsystem connects to the main system via the COM6. The Linux's default supported COM interfaces are COM1~COM4. The Power Subsystem APIs implicitly communicate with power subsystem through COM6. Users must take extra steps to configure Linux kernel in order to support COM6. Please refer to Appendix Programming Guide for more information. Users don't need extraordinary setup on Windows platform to support COM6.

In this Power Subsystem package, we provide:

1. The APIs to access power subsystem.
2. The utility and source code to monitor and set up power modes, ignition status, and power-off time.

P.S. The following is Linux reference pictures about the utility file:

```
[root@RD-System ap_and_lib]# cd power_subsystem/
[root@RD-System power_subsystem]# ls
libPwrAcce.a  libPwrAcce.so  main.c  pwr_acce.h  pwr_utility
[root@RD-System power_subsystem]# ./pwr_utility
```

```
(0) Exit
(1) Set Soft Off Delay.
(2) Set Hard Off Delay.
(3) Set Power On Mode.
(4) Set PIC Default.
(5) Set Soft Off Dealy in minutes.



Please input:
```

4.2 File Descriptions

4.2.1 CAN Bus

On Linux platform:

1. can.h
   It is the header file of the API and macro definitions.
2. libcan.a
   It is the API library in static library format.
3. libcan.so
   The API library is shared library format.
4. cantest
   The file is executable file for test utility.

On Windows platform:

1. AR-B6002.h
   The header file is the APIs and macro definition. This header file is an aggregate header which includes APIs declarations and macros for CAN Bus, GPIO, Watchdog, and Power Subsystem.
2. AR-B6002.lib
   The API library is static library format. This library is an aggregate library. It includes APIs for CAN Bus, GPIO, Watchdog, and Power Subsystem.
3. AR-B6002.dll
   The API library is dynamically linked library format. This library is an aggregate library. It includes APIs for CAN Bus, GPIO, Watchdog, and Power Subsystem.

4.2.2 GPIO and Watchdog

On Linux platform:

1. sio_acce.c
   The source code of the Watchdog and GPIO APIs is for accessing the SuperIO.
2. sio_acce.h
   This file includes the declarations of the APIs and macro definitions.

3. main.c
   It is the source code of the utility.
4. Makefile

On Windows platform:

1. AR-B6002.h
   The header file is the APIs and macro definition. This header file is an aggregate header which includes APIs declarations and macros for CAN Bus, GPIO, Watchdog, and Power Subsystem.
2. AR-B6002.lib
   The API library is static library format. This library is an aggregate library. It includes APIs for CAN Bus, GPIO, Watchdog, and Power Subsystem.
3. AR-B6002.dll
   The API library is dynamically linked library format. This library is an aggregate library. It includes APIs for CAN Bus, GPIO, Watchdog, and Power Subsystem.

4.2.3 Power Subsystem

On Linux platform:

1. pwr_acce.c
   The source code of the APIs is for accessing the power subsystem.
2. pwr_acce.h
   This file includes the declarations of the APIs and macro definitions.
3. main.c
   It is the source code of the utility.
4. Makefile

On Windows platform:

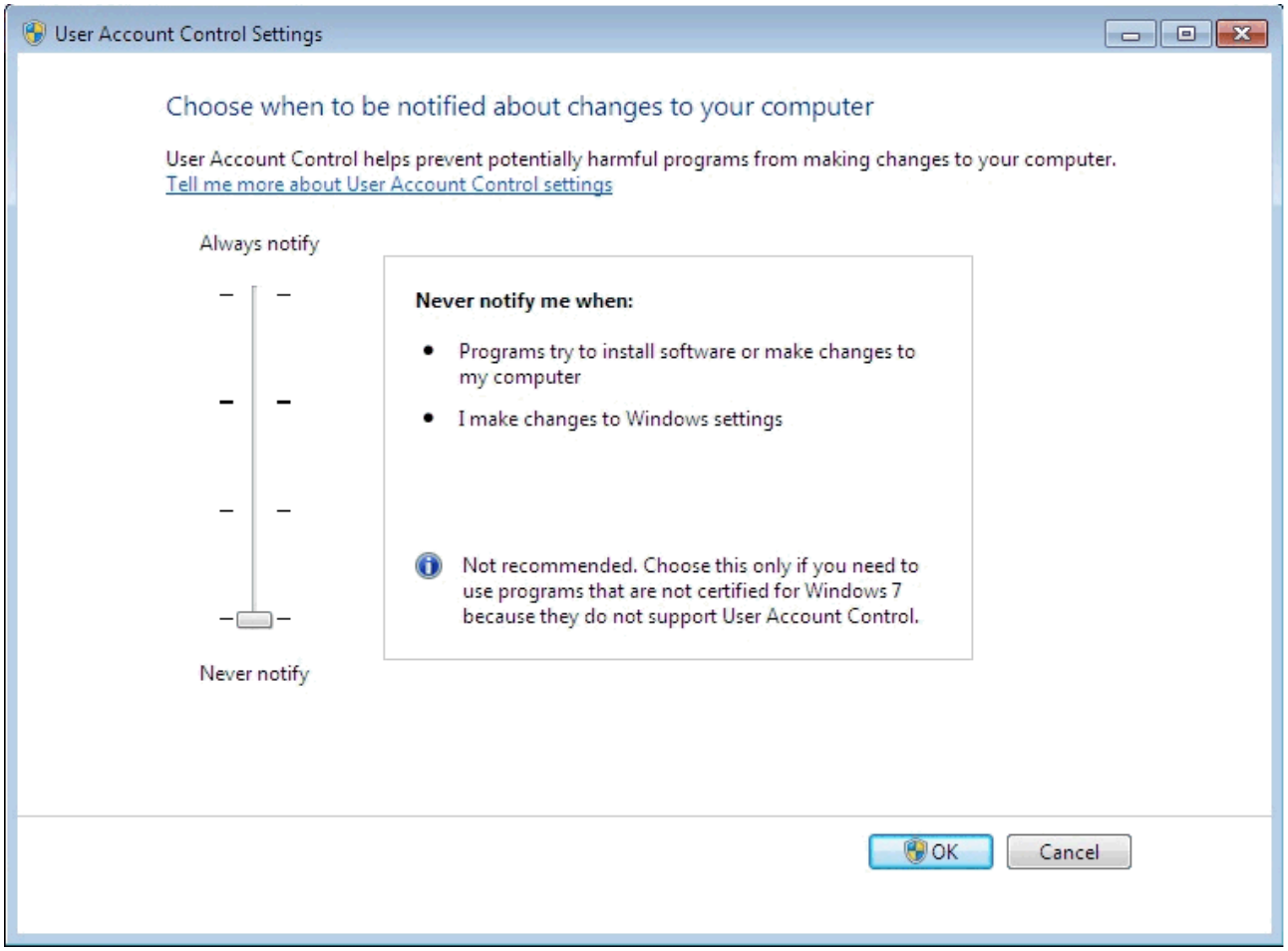
1. AR-B6002.h
   The header file is the APIs and macro definition. This header file is an aggregate header which includes APIs declarations and macros for CAN Bus, GPIO, Watchdog, and Power Subsystem.

2. AR-B6002.lib
   The API library is static library format. This library is an aggregate library. It includes APIs for CAN Bus, GPIO, Watchdog, and Power Subsystem.

3. AR-B6002.dll
   The API library is dynamically linked library format. This library is an aggregate library. It includes APIs for CAN Bus, GPIO, Watchdog, and Power Subsystem.

4.3 API List and Descriptions

Note: For programming under Windows 7 and Vista environment, please take care about Microsoft UAC policy. Or else, user must to change UAC setting from "Default" to "Never Notify" to run the program.


User Account Control Settings
Choose when to be notified about changes to your computer
User Account Control helps prevent potentially harmful programs from making changes to your computer.
Tell me more about User Account Control settings
Always notify
Never notify me when:
Programs try to install software or make changes to my computer
I make changes to Windows settings
Not recommended. Choose this only if you need to use programs that are not certified for Windows 7 because they do not support User Account Control.
Never notify
OK
Cancel

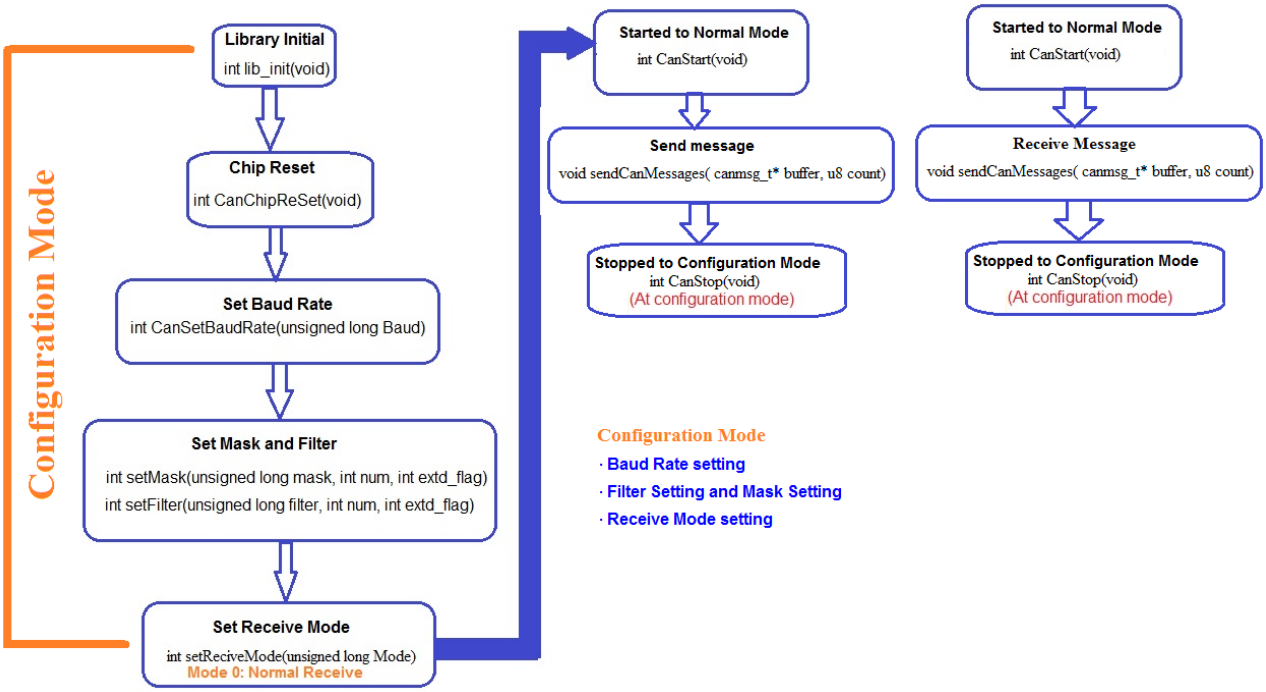
Note: CAN Bus must be initialized before activation by syntax lib_init(void). There are “normal mode” and “configure mode” for CAN bus.

The normal mode can be entered from configure mode by syntax CanStart(void). The normal mode is the standard operating mode. In this mode, the device actively monitors all bus messages and generates acknowledge bits, error frames, etc. This is also the only mode in which the function will transmit messages over the CAN bus.

The configure mode can be entered from normal mode by syntax CanStop(void). Configure mode is the only mode where the following functions are available:

- Baud Rate setting
- Filter Setting and Mask Setting

- Receive Mode setting



4.3.1 CAN Bus

For Linux platform:

1. **Syntax:**

   int lib_init(void)

   Description: This function is used for library calling first. It causes CAN Bus chipset at Configure mode. The mode must change to Normal mode by the syntax "int CanStart(void)" calling before any CAN Bus operating.

   Parameters: None.

   Return Value: This function returns 0, library init successfully. If this function fails, it returns not 0.

2. **Syntax:**

   int CanStart(void)

   Description: This function will resume from configure mode to normal mode for CAN Bus operating..

   Parameters: None.

Return Value: This function returns 0 if it set the Baud rate successfully. If this function fails, it returns not 0.

3. **Syntax:**

   int CanStop(void)

   Description: This function will stop CAN Bus message sending and receiving, as well as into configure mode.

   Parameters: None.

   Return Value: This function returns 0 if it successfully. If this function fails, it returns not 0.

4. **Syntax:**

   void sendCanMessages(canmsg_t* buffer, u8 count)

   Description: This function sends out CAN packages over the CAN bus.

   Parameters: If there is more than one CAN package to send, these CAN packages are stored in a ‘canmsg_t’ array. This function sends out packages in a sequential fashion. The memory address of the first CAN package to send is pointed at the parameter ‘buffer’. The number of CAN packages to send is indicated by the parameter ‘count’. If the resource of sending out the CAN package is temporarily unavailable, the process will be temporarily halted (Block I/O) until the resource is available again.

   Return Value:
   This function returns “0” if message sent successfully.
   This function returns “-1” if message sent failure. This message is abandoned to send.
   This function returns “-2” if CAN bus linking failed.

5. **Syntax:**

   int getCanMessages(canmsg_t* buffer, u8 count)

   Description: This function receives CAN packages from the CAN bus subsystem.

   Parameters: This function stores received CAN packages sequentially at an array of type ‘canmsg_t’. The number of packages to receive is indicated by the parameter ‘count’. Before receiving finished, the process will be temporarily halted (Block I/O) if there is no incoming CAN package.

   Return Value: If this function receives the packages successfully, it returns 0. If this function fails, it returns not 0.

6. **Syntax:**

   int CanSetBaudRate(unsigned long Baud)

   Description: This function sets up the speed (Baud rate) of sending and receiving CAN packages.

   Parameters: The parameter ‘Baud’ could be: (the unit is Kbps)
   10 , 20 , 50 , 100 , 125 , 250 , 500 , 800 , 1000
   The default speed is 0 Kbps.

   Return Value: This function returns 0 if it set the Baud rate successfully. If this function fails, it returns not 0.

7. **Syntax:**

   int CanGetBauRate(unsigned long *Baud)

   Description: This function get the speed (Baud rate) of sending and receiving CAN packages.

   Parameters: The parameter pointer ‘Baud’ record: (the unit is Kbps)
   10, 20, 50, 100, 125, 250, 500, 800, 1000

   Return Value: This function returns 0 if it set the Baud rate successfully. If this function fails, it returns not 0.

8. **Syntax:**

   int setMask(unsigned long mask, int num, int extd_flag)

   Description: This function setMask to can bus chip.

   Parameters: num 0 is set Mask0, 1 is set Mask1.
   extd_flag 1 is 29bit, 0 is 11bit
   mask is mask value, if set 11bit the maximum mask value is 0x7ff,
   else the maximum mask value is 0x1FFFFFFF

   Return Value: This function returns 0 if it set the Mask successfully. If this function fails, it returns not 0.

9. **Syntax:**

   void getMask(unsigned long *mask, int num, int extd_flag)

   Description: This function get Mask from can bus chip.

   Parameters: num 0 is get Mask0, 1 is get Mask1.

extd_flag 1 is 29bit, 0 is 11bit
pointer mask is recored get mask value.

Return Value: None.

10. **Syntax:**

    int setFilter(unsigned long filter, int num, int extd_flag)

    Description: This function set Filter to can bus chip.

    Parameters: num 0~5 is set filter 0~5.
    extd_flag 1 is 29bit, 0 is 11bit
    filter is filter value, if set 11bit the maximum filter value is 0x7ff,
    else the maximum filter value is 0x1FFFFFFF

    Return Value: This function returns 0 if it set the Filter successfully. If this function fails, it returns not 0.

11. **Syntax:**

    void getFilter(unsigned long *filter, int num, int extd_flag)

    Description: This function get Filter from can bus chip.

    Parameters: num 0~5 is get filter 0~5.
    extd_flag 1 is 29bit, 0 is 11bit
    pointer filter is recored get filter value

    Return Value: None.

12. **Syntax:**

    int CanChipReSet(void)

    Description: This function to reset can bus chip. It causes CAN Bus chipset at Configure mode. The mode must change to Normal mode by the syntax "int CanStart(void)" calling before any CAN Bus operating.

    Parameters: None.

    Return Value: This function returns 0 if it reset the chipset successfully. If this function fails, it returns not 0.

13. **Syntax:**

    int setReciveMode(unsigned long Mode)

Description: This function set Receive Mode.

Parameters:

Mode 0 is Normal Receive, Receive all valid messages using either standard or extended identifiers that meet filter criteria.

Mode 1 is Receive only STD , Receive only valid messages with standard identifiers that meet filter criteria

Mode 2 is Receive only EXTD , Receive only valid messages with extended identifiers that meet filter criteria

Mode 3 is Receive any Message , Turn mask/filters off; receive any message

Return Value: This function returns 0 if it set the Receive Mode successfully. If this function fails, it returns not 0.

14. **Syntax:**

int getReciveMode(unsigned long *Mode)

Description: This function get Receive Mode from can chipset.

Parameters: pointer Mode to record the Mode from can chipset.

Mode 0 is Normal Receive, Receive all valid messages using either standard or extended identifiers that meet filter criteria.

Mode 1 is Receive only STD , Receive only valid messages with standard identifiers that meet filter criteria

Mode 2 is Receive only EXTD , Receive only valid messages with extended identifiers that meet filter criteria

Mode 3 is Receive any Message , Turn mask/filters off; receive any message

Return Value: This function returns 0 if it get the Receive Mode successfully. If this function fails, it returns not 0.

15. **Syntax:**

void lib_close(void)

Description: This function is invoked to close library, when you doesn’t use this library.

Parameters: None.

Return Value: None.

For Windows platform:

1. **Syntax:**

   int lib_init(void)

   Description: This function is used for library calling first. It causes CAN Bus chipset at Configure mode. The mode must change to Normal mode by the syntax "int CanStart(void)" calling before any CAN Bus operating.

   Parameters: None.

   Return Value: This function returns 0, library init successfully. If this function fails, it returns not 0.

2. **Syntax:**

   int CanStart(void)

   Description: This function will resume from configure mode to normal mode for CAN Bus operating..

   Parameters: None.

   Return Value: This function returns 0 if it set the Baud rate successfully. If this function fails, it returns not 0.

3. **Syntax:**

   int CanStop(void)

   Description: This function will stop CAN Bus message sending and receiving, as well as into configure mode.

   Parameters: None.

   Return Value: This function returns 0 if it successfully. If this function fails, it returns not 0.

4. **Syntax:**

   void sendCanMessages(canmsg_t* buffer, u8 count)

   Description: This function sends out CAN packages over the CAN bus.

   Parameters: If there is more than one CAN package to send, these CAN packages are

stored in a ‘canmsg_t’ array. This function sends out packages in a sequential fashion. The memory address of the first CAN package to send is pointed at by the parameter ‘buffer’. The number of CAN packages to send is indicated by the parameter ‘count’. If the resource of sending out the CAN package is temporarily unavailable, the process will be temporarily halted (Block I/O) until the resource is available again.

Return Value: None.

5. **Syntax:**

   int getCanMessages(canmsg_t* buffer, u8 count)

   Description: This function receives CAN packages from the CAN bus subsystem.

   Parameters: This function stores received CAN packages sequentially at an array of type ‘canmsg_t’. The number of packages to receive is indicated by the parameter ‘count’. Before receiving finished, the process will be temporarily halted (Block I/O) if there is no incoming CAN package.

   Return Value: If this function receives the packages successfully, it returns 0. If this function fails, it returns not 0.

6. **Syntax:**

   int CanSetBaudRate(unsigned long Baud)

   Description: This function sets up the speed (Baud rate) of sending and receiving CAN packages.

   Parameters: The parameter ‘Baud’ could be: (the unit is Kbps)
   10, 20, 50, 100, 125, 250, 500, 800, 1000
   The default speed is 0 Kbps.

   Return Value: This function returns 0 if it set the Baud rate successfully. If this function fails, it returns not 0.

7. **Syntax:**

   int CanGetBauRate(unsigned long *Baud)

   Description: This function get the speed (Baud rate) of sending and receiving CAN packages.

   Parameters: The parameter pointer ‘Baud’ record: (the unit is Kbps)
   10, 20, 50, 100, 125, 250, 500, 800, 1000

Return Value: This function returns 0 if it set the Baud rate successfully. If this function fails, it returns not 0.

8. **Syntax:**

   int setMask(unsigned long mask, int num, int extd_flag)

   Description: This function set Mask to can bus chip.

   Parameters: num 0 is set Mask0, 1 is set Mask1.
   extd_flag 1 is 29bit, 0 is 11bit
   mask is mask value, if set 11bit the maximum mask value is 0x7ff,
   else the maximum mask value is 0x1FFFFFFF

   Return Value: This function returns 0 if it set the Mask successfully. If this function fails, it returns not 0.

9. **Syntax:**

   void getMask(unsigned long *mask, int num, int extd_flag)

   Description: This function get Mask from can bus chip.

   Parameters: num 0 is get Mask0, 1 is get Mask1.
   extd_flag 1 is 29bit, 0 is 11bit
   pointer mask is recored get mask value.

   Return Value: None.

10. **Syntax:**

    int setFilter(unsigned long filter, int num, int extd_flag)

    Description: This function set Filter to can bus chip.

    Parameters: num 0~5 is set filter 0~5.
    extd_flag 1 is 29bit, 0 is 11bit
    filter is filter value, if set 11bit the maximum filter value is 0x7ff,
    else the maximum filter value is 0x1FFFFFFF

    Return Value: This function returns 0 if it set the Filter successfully. If this function fails, it returns not 0.

11. **Syntax:**

    void getFilter(unsigned long *filter, int num, int extd_flag)

Description: This function get Filter from can bus chip.

Parameters: num 0~5 is get filter 0~5.
extd_flag 1 is 29bit, 0 is 11bit
pointer filter is recored get filter value

Return Value: None.

12. **Syntax:**

    int CanChipReSet(void)

Description: This function to reset can bus chip. It causes CAN Bus chipset at Configure mode. The mode must change to Normal mode by the syntax "int CanStart(void)" calling before any CAN Bus operating.

Parameters: None.

Return Value: This function returns 0 if it reset the chipset successfully. If this function fails, it returns not 0.

13. **Syntax:**

    int setReciveMode(unsigned long Mode)

Description: This function set Receive Mode.

Parameters:

Mode 0 is Normal Receive, Receive all valid messages using either standard or extended identifiers that meet filter criteria.

Mode 1 is Receive only STD , Receive only valid messages with standard identifiers that meet filter criteria

Mode 2 is Receive only EXTD , Receive only valid messages with extended identifiers that meet filter criteria
Mode 3 is Receive any Message , Turn mask/filters off; receive any message

Return Value: This function returns 0 if it set the Receive Mode successfully. If this function fails, it returns not 0.

14. **Syntax:**

    int getReciveMode(unsigned long *Mode)

Description: This function get Receive Mode from can chipset.

Parameters: pointer Mode to record the Mode from can chipset.

Mode 0 is Normal Receive, Receive all valid messages using either standard or extended identifiers that meet filter criteria.

Mode 1 is Receive only STD, Receive only valid messages with standard identifiers that meet filter criteria

Mode 2 is Receive only EXTD, Receive only valid messages with extended identifiers that meet filter criteria

Mode 3 is Receive any Message, Turn mask/filters off; receive any message

Return Value: This function returns 0 if it get the Receive Mode successfully. If this function fails, it returns not 0.

15. **Syntax:**

    void lib_close(void)

Description: This function is invoked to close library, when you doesn't use this library.

Parameters: None.

Return Value: None.

4.3.2 GPIO and Watchdog

GPIO

Under Linux platform:

1. **Syntax:**

   i32 getInChLevel(i32 channel, u8 *val)

Description: Get the value of GPIO Input and put the value at *val.

Parameters:

I. The parameter 'channel' indicates the GPIO Input pins to show. Users can use the macros GPI0, GPI1, GPI2, GPI3 to indicate the GPIO Input channel. For example:

```
getInChLevel( GPI2, &val);    // Indicate the GPIO Input channel 2
getInChLevel( GPI0 | GPI3, &val);    // Indicate the GPIO Input
                                     // channel 0 and channel 3
```

II. The parameter ‘val’ is an unsigned character pointer. The function puts the values of the indicated GPIO channels at the memory pointed by ‘val’. The bit 0 of *val shows the value of GPIO Input channel 0. The bit 1 of *val shows the value of GPIO Input channel 1. Other bits show the corresponding GPIO Input channels. Because there are only four channels, bit 4 ~ bit 7 of *val are always zero.

Here is an example:
If GPIO Input channel 1 and channel 3 are both 1.

```
unsigned char ch;
getInChLevel( GPI1|GPI3, &ch );
```

The returned value of variable ‘ch’ is 0xa.

Return Value: If the function gets the values successfully, it returns 0. If any error, it returns –1.

2. Syntax:

```
i32 setOutChLevel( i32 channel, u8 val )
```

Description: Set the value of GPIO Output according to the variable ‘val’.

Parameters:

I. The parameter ‘channel’ indicates the GPIO Output pins to set. Users can use the macros GPO0, GPO1, GPO2, GPO3 to indicate the GPIO Output channels.

II. The parameter ‘val’ indicate the value to be set to GPIO Output channel. The acceptable values is limited to 0 and 1.

For example:

```
/* Setting the GPIO Output channel 2 to 1 */
setOutChLevel( GPO2, 1 );

/* Setting the GPIO Output channel 0 and channel 3 to 0 */
getInChLevel( GPO0 | GPO3, 0 );
```

Return Value: If the function sets the values successfully, it returns 0. If any error, it returns –1.

3. Syntax:

```
i32 getOutchLevel( i32 channel, u8 *val )
```

Description: Get the value of GPIO Output and put the value at *val.

Parameters:

I. The parameter ‘channel’ indicates the GPIO Output pins to show. Users can use the macros GPO0, GPO1, GPO2, GPO3 to indicate the GPIO Output channel. For example:

```
getOutChLevel( GPO2, &val);    // Indicate the GPIO Output channel 2

/* Indicate the GPIO Output channel 0 and channel 3. */
getOutChLevel( GPO0 | GPO3, &val);
```

II. The parameter ‘val’ is an unsigned character pointer. The function puts the values of the indicated GPIO channels at the memory pointed by ‘val’. The bit 0 of *val shows the value of GPIO Output channel 0. The bit 1 of *val shows the value of GPIO Output channel 1. Other bits show the corresponding GPIO Output channels. Because there are only four channels, bit 4 ~ bit 7 of *val are always zero.

Here is an example:
If GPIO Output channel 0 and channel 2 are both 1.

```
unsigned char ch;
getOutChLevel( GPO0|GPO2, &ch );
```

The returned value of variable ‘ch’ is 0x5.

Return Value: If the function gets the values successfully, it returns 0. If any error, it returns –1.

Under windows platform:

1. **Syntax:**

```
int getGPIOBitValue(int iBitNumber, bool * bValue)
```

Description: Get the value of GPIO and put the value at * bValue.

Parameters:

I. The parameter ‘iBitNumber indicates the GPIO Input pins to show. Users can use the macros GPO_BIT_0, GPO_BIT_1, GPO_BIT_2, GPO_BIT_3, GPI_BIT_4, GPI_BIT_5, GPI_BIT_6, or GPI_BIT_7 to indicate the GPIO channel. For

example:

```
getGPIOBitValue (GPO_BIT_0, &val);
    // Indicate the GPIO Output channel 0
getGPIOBitValue (GPI_BIT_6, &val);
    // Indicate the GPIO Input channel 6
```

II. The parameter ‘bValue’ is an bool pointer. The function puts the values of the indicated GPIO channels at the memory pointed by ‘bValue’. True indicates HI, and false indicates LOW.

Return Value: If the function gets the values successfully, it returns 0. If any error, it returns not zero.

2. **Syntax:**

```
int setGPIOBitValue(int iBitNumber, bool bValue)
```

Description: Set the value of GPIO Output according to the variable ‘bValue’.

Parameters:

I. The parameter ‘channel’ indicates the GPIO Output pins to set. Users can use the macros GPO_BIT_0, GPO_BIT_1, GPO_BIT_2, or GPO_BIT_3 to indicate the GPIO Output channels.

II. The parameter ‘bValue’ indicate the value to be set to GPIO Output channel. True indicates HI, and false indicates LOW.

For example:

```
/* Setting the GPIO Output channel 2 to HI */
setGPIOBitValue (GPO_BIT_2, true );

/* Setting the GPIO Output channel 3 to LOW */
setGPIOBitValue (GPO_BIT_3, false );
```

Return Value: If the function sets the values successfully, it returns 0. If any error, it returns not zero.

Watchdog

Under Linux platform:

1. **Syntax:**

```
u8 getWtdTimer(void)
```

Description: This function read the value of the watchdog time counter and return it to the caller.

Parameters: None.

Return Value: This function return the value of the time counter and return it to the caller as an unsigned integer.

2. **Syntax:**

    void setWtdTimer(u8 val)

Description: This function sets the watchdog timer register to the value ‘val’ and starts to count down. The value could be 0 ~ 255. The unit is second. Setting the timer register to 0 disables the watchdog function and stops the countdown.

Parameters: The parameter ‘val’ is the value to set to watchdog timer register. The range is 0 ~ 255.

Return Value: None.

Under windows platform:

1. **Syntax:**

    int readWatchdog(unsigned char * pucValue)

Description: This function read the value of the watchdog time counter and return it to the caller.

Parameters: The parameter ‘pucValue’ is an unsigned character pointer. The function puts the values read from watchdog at the memory pointed by ‘pucValue’.

Return Value: If the function gets the values successfully, it returns 0. If any error, it returns not zero.

2. **Syntax:**

    int startWatchdog(unsigned char ucUnit, unsigned char ucValue)

Description: This function sets the watchdog timer register to the value ‘ucValue’ and starts to count down. The value could be 0 ~ 255. The unit is second. Setting the timer register to 0 disables the watchdog function and stops the countdown.

Parameters: The parameter ‘ucUnit’ is the unit to set to watchdog timer register. ‘0’ indicates second. And ‘1’ indicates minute. The parameter ‘ucValue’ is the value to set to watchdog timer register. The range is 0 ~ 255.

Return Value: If the function gets the values successfully, it returns 0. If any error, it returns not zero.

4.3.3 Power Subsystem

Under Linux platform:

1. **Syntax:**

   i32 getIgnStatus(u8 *ignStatus)

   Description: Get the current ignition status. The ignition has two statuses: ON or OFF.

   Parameters: This function puts the ignition status at the memory pointed by the unsigned character pointer ‘ignStatus’. If the returned status is 0xa5, the ignition is ON. If the returned status is 0x5a, the ignition is OFF. There are macros of Ignition ON and Ignition OFF in pwr_acce.h.

   Return Value: If the function gets the ignition status and put it at the memory pointed by the argument successfully, this function will return 0. If any error, the function returns –1.

2. **Syntax:**

   i32 setSoftOffDelayS(u32 setTime)

   Description: The Soft Off Delay is the interval between that the system receives a power off signal and that the system generates a power off signal. This function sets up the interval in seconds.

   Parameters: The parameter is of the type of unsigned long. The value of the parameter ranges from 0~255. The unit of the value of the parameter is seconds.

   Return Value: If the function sets the delay time successfully, it will return 0. If any error, the function returns –1.

3. **Syntax:**

   i32 setSoftOffDelayM(u32 setTime)

   Description: The Soft Off Delay is the interval between that the system receives a power off signal and that the system generates a power off signal. This function sets up the interval in minutes.

   Parameters: The parameter is of the type of unsigned long. The value of the parameter ranges from 0~255. The unit of the value of the parameter is minutes.

Return Value: If the function sets the delay time successfully, it will return 0. If any error, the function returns –1.

4. **Syntax:**

   i32 setHardOffDelayS(u32 setTime)

   Description: The Hard Off Delay is the interval between that the system is off and that the power 5VSB is off. This functions set up the interval in seconds.

   Parameters: The parameter is of the type of unsigned long. The value of the parameter ranges from 0~255. The unit of the value of the parameter is seconds.

   Return Value: If the function sets the delay time successfully, it will return 0. If any error, the function returns –1.

5. **Syntax:**

   i32 setHardOffDelayM(u32 setTime)

   Description: The Hard Off Delay is the interval between that the system is off and that the power 5VSB is off. This functions set up the interval in minutes.

   Parameters: The parameter is of the type of unsigned long. The value of the parameter ranges from 0~255. The unit of the value of the parameter is minutes.

   Return Value: If the function sets the delay time successfully, it will return 0. If any error, the function returns –1.

6. **Syntax:**

   i32 setPowerOnMode(u8 powerOnMode)

   Description: The function sets up the source of the boot-up signal of the system. There are two choices: boot from the Ignition or boot from the Remote Switch.

   Parameters:

   PowerOnMode = 0xa5, boot up by the Ignition.
   PowerOnMode = 0x5a, boot up by the Remote Switch.

   There are macros of Ignition mode and Remote Switch mode in pwr_acce.h (Linux) and AR-B6002.h(Windows).

   Return Value: If the function sets power-on mode successfully, it will return 0. If any error, the function returns –1.

7. **Syntax:**

   i32 getSoftOffDelay(u32 *Time)

   Description: The Soft Off Delay is the interval between that the system receives a power off signal and that the system generates a power off signal. This function gets the interval.

   Parameters: The parameter is a pointer which points to an unsigned long variable. The returned value is stored at this variable. The unit of the returned value is in seconds.

   Return Value: If the delay time is returned successfully, the function returns 0. If any error, it returns –1.

8. **Syntax:**

   i32 getHardOffDelay(u32 *Time)

   Description: The Hard Off Delay is the interval between that the system is off and that the power 5VSB is off. This function gets the interval.

   Parameters: The parameter is a pointer which points to an unsigned long variable. The returned value is stored at this variable. The unit of the returned value is in seconds.

   Return Value: If the delay time is returned successfully, the function returns 0. If any error, it returns –1.

9. **Syntax:**

   i32 getPowerOnMode(u8 *powerOnMode)

   Description: The function gets the setting of power-on mode. There are two modes: boot from the Ignition or boot from the Remote Switch.

   Parameters: The parameter is a pointer which points to an unsigned character. The returned code is stored at this memory. There are two power-on modes:

   PowerOnMode = 0xa5, boot up by the Ignition.
   PowerOnMode = 0x5a, boot up by the Remote Switch.

   Return Value: If the power-on mode is returned successfully, the function returns 0. If any error, it returns –1

10. **Syntax:**

    i32 getBattVolt(float *volt)

    Description: The function gets the voltage reading of the battery.

Parameters: The parameter ‘volt’ is a pointer which points to an variable of type ‘float’. The unit of the returned value is voltage.

Return Value: If the reading of voltage is returned successfully, the function returns 0. If any error, it returns –1

11. Syntax:

```
i32 getPicFwVer( struct PicInfo *ver )
```

Description: The function gets version information of Power Subsystem firmware.

Parameters: The parameter is a pointer which points to a ‘PicInfo’ structure, which consists of 9 unsigned characters. Here is the definition of structure ‘PicInfo’:

```
type struct {
 u8 type[3];       // The type of the power subsystem
          u8 mode[4];     // The mode at which the power subsystem is
                             operating.
 u8 majorVersion;    // Major version number of the firmware
 u8 minorVersion;    // Minor version number of the firmware
} PicInfo;
```

```
PicInfo picInfo;

getPicFwVer( &picInfo );
printf(“%c.%c\n”, picInfo.majorVersion, picInfo.minorVersion );
```

Return Value: If the version information is returned successfully, the function returns 0. If any error, it returns –1.

12. Syntax:

```
i32 getPicMode( u8 *mode )
```

Description: The function gets the mode number at which the Power Subsystem is operating..

Parameters: The parameter is a pointer which points to a variable of type ‘unsigned char’. The returned mode number is put at the memory which is pointed by parameter ‘mode’.

Return Value: If the mode information is returned successfully, the function returns 0. If any error, it returns –1

13. **Syntax:**

    i32 setPicDefault(void)

    Description: The function restores the SoftOffDelay and HardOffDelay to the default value.

    Parameters: None.

    Return Value: If this function works successfully, the function will return 0. If any error, it will return –1.

Under windows platform:

1. **Syntax:**

    BOOL PowerPic_GetIgnitionStatus(BYTE* pStatus)

    Description: Get the current ignition status. The ignition has two statuses: ON or OFF.
    Parameters: This function puts the ignition status at the memory pointed by the BYTE pointer ‘pStatus’. If the returned status is 0xa5, the ignition is ON. If the returned status is 0x5a, the ignition is OFF. There are macros of Ignition ON and Ignition OFF.
    Return Value: If the function gets the ignition status and put it at the memory pointed by the argument successfully, this function will return TRUE. If any error, the function returns FALSE.

2. **Syntax:**

    BOOL PowerPic_SetSoftOffDelayTime(int nTime, int nTimeUnit)

    Description: The Soft Off Delay is the interval between that the system receives a power off signal and that the system generates a power off signal.

    Parameters: The parameter ‘nTime‘ is the value to set as delay interval. The value of the parameter ‘nTime‘ ranges from 0~255. The parameter ‘nTimeUnit‘ is the unit of nTime. Users can use macros TIME_UNIT_SECOND or TIME_UNIT_MINUTE to indicate unit.

    Return Value: If the function sets the soft off delay successfully, this function will return TRUE. If any error, the function returns FALSE.

3. **Syntax:**

    BOOL PowerPic_SetHardOffDelayTime(int nTime, int nTimeUnit)

Description: The Hard Off Delay is the interval between that the system is off and that the power 5VSB is off.

Parameters: The parameter ‘nTime‘ is the value to set as delay interval. The value of the parameter ‘nTime‘ ranges from 0~255. The parameter ‘nTimeUnit‘ is the unit of nTime. Users can use macros TIME_UNIT_SECOND or TIME_UNIT_MINUTE to indicate unit.

Return Value: If the function sets the hard off delay successfully, this function will return TRUE. If any error, the function returns FALSE.

4. **Syntax:**

   BOOL PowerPic_SetPowerOnMode(BYTE bMode)

   Description: The function sets up the source of the boot-up signal of the system. There are two choices: boot from the Ignition or boot from the Remote Switch.

   Parameters:

   bMode = 0xa5, boot up by the Ignition.
   bMode = 0x5a, boot up by the Remote Switch.

   There are macros of Ignition mode and Remote Switch mode in pwr_acce.h (Linux) and AR_B6002_LIB.h(Windows).

   Return Value: If the function sets the power on mode successfully, this function will return TRUE. If any error, the function returns FALSE.

5. **Syntax:**

   BOOL PowerPic_GetSoftOffDelayTime(int* pSeconds)

   Description: The Soft Off Delay is the interval between that the system receives a power off signal and that the system generates a power off signal. This function gets the interval.

   Parameters: The parameter ‘pSeconds‘ is a pointer which points to an int variable. The returned value is stored at this variable. The unit of the returned value is in seconds.

   Return Value: If the function gets the soft off delay successfully, this function will return TRUE. If any error, the function returns FALSE.

6. **Syntax:**

   BOOL PowerPic_GetHardOffDelayTime(int* pSeconds)

Description: The Hard Off Delay is the interval between that the system is off and that the power 5VSB is off. This function gets the interval.

Parameters: The parameter ‘pSeconds’ is a pointer which points to an int variable. The returned value is stored at this variable. The unit of the returned value is in seconds.

Return Value: If the function gets the hard off delay successfully, this function will return TRUE. If any error, the function returns FALSE.

7. **Syntax:**

    BOOL PowerPic_GetPowerOnMode(BYTE* pMode)

Description: The function gets the setting of power-on mode. There are two modes: boot from the Ignition or boot from the Remote Switch.

Parameters: The parameter ‘pMode’ is a pointer which points to an BYTE. The returned code is stored at this memory. There are two power-on modes:

* pMode = 0xa5, boot up by the Ignition.
* pMode = 0x5a, boot up by the Remote Switch.

Return Value: If the function gets the power in mode successfully, this function will return TRUE. If any error, the function returns FALSE.

8. **Syntax:**

    BOOL PowerPic_GetBatteryVoltage(float *pVoltage)

Description: The function gets the voltage reading of the battery.

Parameters: The parameter ‘pVoltage’ is a pointer which points to an variable of type ‘float’. The unit of the returned value is voltage.

Return Value: If the function gets the battery voltage successfully, this function will return TRUE. If any error, the function returns FALSE.

9. **Syntax:**

    BOOL PowerPic_GetFirmwareVersion(T_PIC_INFO *pPicInfo)

Description: The function gets version information of Power Subsystem firmware.

Parameters: The parameter is a pointer which points to a ‘T_PIC_INFO’ structure, which consists of 9 BYTE. Here is the definition of structure ‘T_PIC_INFO’:

type struct {

typedef struct _T_PIC_INFO {

```
BYTE PicType[ 3 ];
BYTE PicModel[ 4 ];
BYTE PicMajorVersion;
BYTE PicMinorVersion;

} T_PIC_INFO;
```

Return Value: If the function gets the firmware version successfully, this function will return TRUE. If any error, the function returns FALSE.

10. **Syntax:**

```
BOOL PowerPic_GetPicMode( BYTE* pMode )
```

Description: The function gets the mode number at which the Power Subsystem is operating..

Parameters: The parameter is a pointer which points to a variable of type ‘BYTE’. The returned mode number is put at the memory which is pointed by parameter ‘pMode’.

Return Value: If the function gets the PIC mode successfully, this function will return TRUE. If any error, the function returns FALSE.

11. **Syntax:**

```
BOOL PowerPic_SetDefaultValue()
```

Description: The function restores the SoftOffDelay and HardOffDelay to the default value.

Parameters: None.

Return Value: If the function sets the default value successfully, this function will return TRUE. If any error, the function returns FALSE.

4.4 Appendix Programming Guide

Users have to modify the boot loader configuration to support COM6. Take the grub configuration file as an example. Add '8250.nr_uarts=XX noirqdebug' at the setting of kernel. Here, XX represents the number of COM ports the system will support. Because the power subsystem connects to main system via COM6, the XX must be greater or equal to 6.

1. Modify the grub.conf.

[root@linux ~]# vi /boot/grub/grub.conf
default=0
timeout=5
splashimage=(hd0,0)/grub/splash.xpm.gz
hiddenmenu
title Fedora Core (2.6.27.5.117.FC10)
root (hd0,0)
kernel /vmlinuz-2.6.27.5.117.FC10 ro root=/dev/hda2 rhgb quiet
8250.nr_uarts=6 noirqdebug
initrd /initrd-2.6.27.5.117.FC10.img

2. List the status of the COM ports in the system.

setserial -g /dev/ttyS*
/dev/ttyS0, UART: 16550A, Port: 0x03f8, IRQ: 4
/dev/ttyS1, UART: 16550A, Port: 0x02f8, IRQ: 3
/dev/ttyS2, UART: 16550A, Port: 0x03e8, IRQ: 11
/dev/ttyS3, UART: 16550A, Port: 0x02e8, IRQ: 10
/dev/ttyS4, UART: 16550A, Port: 0x04f8, IRQ: 11
/dev/ttyS5, UART: 16550A, Port: 0x04e8, IRQ: 10

The node '/dev/ttyS5' corresponds to COM6. The IO port is 0x4e8, IRQ 10.

5 OPTIONAL MODULE INTRODUCTIONS

Acrosser has verified some optional modules for different applications. The following is brief introduction:

5.1 GPS Module

Acrosser verify a high performance, low power consumption、small size、very easy integrated GPS engine board, designed for a broad spectrum of in-vehicle applications. The GPS engine board will track satellites, provide fast time-to-first-fix and quick navigation updates.

Features

- Build on high performance and high sensitivity GPS chipset
- Quick Cold Start time and Warm Start time

5.2 Bluetooth Module

Customers can easily connect Bluetooth device with our system.

Features

- High reliable Single Chip Bluetooth System
- Bluetooth 2.1 + EDR support
- Class 2 Bluetooth operation with full 7 slave Piconet support
- Full Speed USB interface compliant with USB V1.1 and compatible with USB V2.0
- Single onboard Antenna connector support
- Simple Pairing, Version 2.1 + EDR to advance its short range wireless technology
- compatible with USB V2.0 Full Speed (12Mbits/s)

5.3 WiFi Module

Acrosser also certify suitable WiFi Module with our system. With this module, customers can connect with other WiFi network to download and upload data quickly.

Features

- IEEE 802.11 b/g/n standards
- PCI Express half-size Mini Card interface
- Up to 150~300 Mbps data rate
- WEP/WPA/WPA2 security
- MIMO technology
- Low power consumption for embedded system

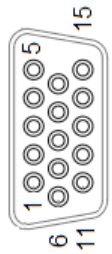
5.4 3.5G Module

When driving on the road, our system can equip with 3.5G module which can connect wireless network via carrier base station.

Features

- Support GSM/GPRS/EDGE/UMTS/HSDPA
- PCI Express full-size Mini Card interface

5.5 GPIO and CAN bus cable color



PIN	Color	PIN	Color
1	Brown	2	Orange
3	Green	4	Blue
5/6/9	Black	8	White
7	Red/White	10	Purple
11	Light Green	12	Light Blue
13	Pink	14	Brown/White
15	Yellow		

PIN	Color
1	white
2	purple

FAQ

What kind of programming language has been verified with the bundled source codes?

Acrosser provides driver and library for development purposes. Customers can refer to develop their own applications. We have verified them with C, C++ and QT programming language. For other customized or special programming language, please check with Acrosser local sales rep. or authorized channels that will help you.

Does it support USB with power adapter hub?

Acrosser recommend to use standard USB hub.

Appendix: Technical Support Form

We deeply appreciate you purchase Acrosser products. Please find “tech_form.doc” file in our utility CD. If you have any questions or problems about Acrosser products, please fill in the following information: We will answer your questions a.s.a.p.

1) Describe your info and system info
   A. Your company name: _____
   B. Your contact info: _____ & phone number: _____
   C. Your e-mail address: _____
   D. Your company address: _____
      _____
   E. Acrosser model name: _____
   F. Acrosser Serial Number: _____
2) Describe system configuration
   A. CPU _____
   B. Memory size _____
   C. Storage (e.g. HDD or CF or SSD) _____
   D. Extra peripherals (e.g. graphic card) _____
   E. Operating system & version (e.g. Windows 7 embedded) _____
   F. Special API or driver _____ (If yes, please provide it for debug,)
   G. Running applications _____
   H. Other _____
3) Describe your problems or questions:

4) Send the above info to one of the following Acrosser contact windows:
   A. Acrosser local Sales Rep
   B. Acrosser authorized channels
   C. Acrosser e-mail window --- http://www.acrosser.com/inquiry.html
   D. Acrosser FAX number --- 886-2-29992887

Acrosser Headquarters

新北市三重區重新路五段609巷12號10樓

10F., No.12, Lane 609, Sec. 5, Chongsin Rd., Sanchong District, New Taipei City 241, Taiwan, R.O.C.

TEL: +886-(0)2-2 9999 000

FAX: +886-(0)2-2999-2887

acrosserinfo@acrosser.com

Acrosser Taichung Office

台中市南屯區河南路四段162號12樓之6

12-6, No.162, Sec. 4, Henan Rd., Nantun Dist., Taichung City 408, Taiwan R.O.C.

TEL: +886-(0)4-2251-0659

FAX: +886-(0)4-2254-6079

Acrosser China Subsidiary

欣扬通电子有限公司 深圳分公司

深圳市福田区车公庙泰然九路21号 皇冠科技园3栋2楼东面A区 (邮编:518040)

A East 2F 3th Building, Crown Estate No.21, 9 Tai-Ran Road, Che Gong Miao, Futian Dist, Shenzhen, China (Postal:518040)

TEL :+86-0755-83542210/2230/2240/2250/2260

FAX :+86-0755-83700087

Acrosser Shanghai Office

欣扬通电子有限公司 上海分公司

上海市徐汇区零陵路631号爱乐大厦12E (邮编:200085)

12E, Aile Building, No.631, Ling-ling Road, Xu-hui Dist, Shanghai, China (Postal:200085)

TEL :+86-021-64288853

FAX :+86-021-64288854

Acrosser Beijing Office

欣扬通电子有限公司 北京分公司

北京市海淀区安宁庄西三条9号宜品上层2-703(邮编:100085)

Room 2-703,Yipinshangceng,No.9,Xisantiao,Anning Zhuang,Haidian Dist,Beijing (Postal:100085)

TEL :+86-010-82359009

FAX :+86-010-82359003

Acrosser USA Subsidiary

11235 Knott Ave. Suite A, Cypress, CA 90630, USA

Toll Free: +1-866-401-9463

TEL: +1-714-903-1760

FAX: +1-714-903-5629

info@acrosserusa.com